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THE USE OF TANKS IN UNDEVELOPED COUNTRY.

By LIEUT.-COLONEL P. JOHNSON, D.S.O.

On Wednesday, 8th December, 1920.

MAJOR-GENERAL SIR A. L. LYNDEN-BELL, K.C.B., K.C.M.G., in the Chair.

THE CHAIRMAN: Ladies and Gentlemen, I am very glad to see that there are ladies here to-night. I have no doubt that Colonel Johnson is very well known to most of you, but in case anyone is present who does not know him, I may say that Colonel Johnson has been connected with tanks ever since the earliest inception of the idea. He was in France the whole time. Most of his time was spent in designing new kinds of tanks; and in 1918, when it became obvious that the tanks we had were much too slow for the job, Colonel Johnson was put on to design a new tank. He designed what we now know as the Medium D Tank, which I think would undoubtedly have had a very decisive effect on the War had it lasted a little longer. After the Armistice Colonel Johnson actually produced two or three experimental tanks which got up to a speed of twenty miles an hour. At the beginning of this year we thought it would be a good idea to send an expert like Colonel Johnson out to India, to find out how far the tank could be adapted to the country on the north-western frontier of India. He accordingly proceeded to India and stayed there for six months, where he had every opportunity of seeing how the tank would fare over various kinds of ground and under different kinds of climate. He also had the opportunity of seeing what was going on in connection with the frontier campaign then in progress, and he has some very interesting things to tell you. I do not propose to tell the story myself, and I will therefore now ask Colonel Johnson to read his lecture.

LECTURE.

1. In considering the use of tanks in undeveloped country I think we may exclude from consideration the improbable event of meeting an enemy which is a well-armed, highly-equipped, and intelligently-led European force. If we assume this, then it may be said at once that the enemy of the tank is physical geography. Mountains, forests, swamps and badly-broken ground, for the present, at any rate, are practically impossible of negotiation by any known type of machine. But these features, fortunately, are not the *general* characteristics in undeveloped countries. In India, Egypt, Mesopotamia, Canada, South Africa, etc., the average conditions are much more of the nature of rolling plains of grass, sand or silt. The general characteristics are such as to make the operation of tracked vehicles a relatively simple matter, because, short of the four major obstacles referred to above, practically any type of ground is negotiable by the modern tracked vehicle. Water obstacles, such as streams, rivers, or lakes occur with more or less frequency, and any machine unable to cope with such obstacles might in many circumstances be seriously handicapped.

2. The human enemy likely to be met with in undeveloped country is probably handicapped by lack of effective leading, organization, supplies of modern weapons, and means of communication: for instance, such an enemy is unlikely to possess effective or intelligently-handled artillery, the chief enemy of the tank in the Great War. It is still more improbable that such an enemy will be equipped with such modern weapons as aeroplanes, tanks, gas, anti-tank weapons, etc., or alternatively with the means of producing them. In a word, it is guerilla forces, and the general characteristics of such forces which will have to be taken into consideration.

If, as is more than probable, the most effective weapon possessed by such forces is the modern rifle, to which the tank is immune, we go back at once to physical geography as being the real enemy of the tank in undeveloped country.

3. It has been demonstrated by experiment that tanks can be produced which have the following characteristics:—

(*a*) They can be made immune to machine-gun or rifle fire.

(*b*) They can travel over suitable ground at twenty to thirty miles per hour, and can climb slopes up to forty-five degrees.

(*c*) They can carry supplies necessary to maintain their crews in condition for a week, or a fortnight, if necessary.

(*d*) They can carry weapons of offence up to and including field artillery.

(*e*) They can travel without renewing their supplies of fuel or water for a distance of 300 to 400 miles, and, if special provision is made for it, these distances can be still further greatly increased.

(*f*) They can be made to float and negotiate water obstacles such as streams, rivers or lakes.

It is not suggested that any machine embodying all these characteristics in anything like final or reasonably reliable form is yet in existence. The stage reached at the moment is that the possibility and practicability of such machines have been experimentally demonstrated. But between this stage and the production of the finished product a rather lengthy period employed in boiling down, perfecting, and testing details is inevitable.

4. A short specification for the chassis of a tank for general purposes in undeveloped country would be roughly as follows:—

(*a*) In general design it would follow very much on the lines of existing mechanical vehicles of the armoured lorry type, but would, of course, be fitted with tracks instead of wheels.

(*b*) It would have a maximum speed of not less than twenty miles per hour, and should be capable of maintaining an average of eight to ten miles per hour for long distances.

(*c*) Without any special arrangements, it should have a possible circuit of action of 200 to 300 miles.

(*d*) It should be capable of floating on water, and of propelling itself against a stream, travelling at three or four miles per hour.

(*e*) It should be tropical-weather-proof.

(*f*) Its weight laden should be in the neighbourhood of six tons, this figure, of course, varying with the type of body work and the load carried.

5. In considering the types of body work required for such a chassis it should be borne in mind that the object should be to produce a sufficient variety of types to ensure that all the functions of an expeditionary force necessary to subdue an enemy can be performed. If this is not done, the necessity at once arises for the co-operation of other arms with a mobile tank force, which co-operation, as will be seen later, can only result in limiting the effectiveness of such a force.

The types of machines required, therefore, are as follows:—

Machine gun.
Trench mortar.
Supply.
Tender.
Signal.
Ambulance.
Artillery.

6. The functions of the machine-gun type would primarily be to engage the enemy with machine-gun fire whenever opportunity offered. Damage to enemy material possessions, such as flocks and herds, might also be effected by this machine, and it might also be required for patrol and communication work.

The functions of the trench-mortar type of machine would primarily be the destruction of enemy material property, in the shape of towns, villages, etc., and possibly the shelling of bodies of the enemy in

otherwise inaccessible places should targets offer. A 6-inch trench mortar with fifty rounds of ammunition is a perfectly feasible outfit to carry on such a machine. However solidly constructed, the destruction of any villages by such machines at point blank range would be a comparatively simple matter.

The functions of the supply machine would be to carry ammunition, fuel, etc., and to maintain the tank force in effective operation where necessary for longer periods than the supplies carried on the machines themselves could make feasible. These supply machines would normally be equipped to carry about three-tons load; the vital parts of them would be armoured, to obviate the necessity for their protection when passing through enemy country, and, for the same reason, they would be normally equipped with, say, one automatic rifle. Alternatively to a load of supplies, such machines could be arranged to carry a load of twenty to twenty-five men: this would, however, only be in the event of the lengthened occupation of a portion of an enemy country, when personnel other than the crews of the machines might be required for such work as the formation of a camp, base or strong point.

The functions of the tender machine would be to render first aid to any of the other machines in difficulties, to remove or modify, by means of explosives, tools, etc., carried, any obstructions hindering the progress of the column, and to carry out, with a specially-trained crew, any material destruction to enemy property which might be considered desirable, and which might not in special circumstances be possible to effect with any of the other machines.

The functions of the signal machine would primarily be for communication, command and direction. These machines should be capable on the move of receiving wireless messages from aeroplanes. They should probably be provided with a light telescopic mast, hoisted from the inside when stationary, from which wireless messages could be sent back to a base several hundred miles away. Simpler forms of communication, such as flags and audible signals, would probably be used by these machines for communicating directions to the other machines of the column.

The functions of the ambulance machine are obvious. In a force composed entirely of protected and armoured tanks operating against guerilla forces the casualties resulting from enemy action are not likely to be heavy. Casualties from sickness, however, and other causes, must be provided for, and a certain number of ambulance machines are doubtless essential. In such a machine fitted with a compensating spring track the degree of comfort available far exceeds what is possible with a well-sprung wheeled ambulance on indifferent roads, and the rapidity with which sick and wounded could be brought back to a base would be invaluable.

The functions of the artillery machine are fairly obvious. They would supplement the work of the trench-mortar machines where it might be found impracticable to bring these within point blank range of a position required to be shelled. The weapon carried would probably be limited to an 18-pounder gun, or 4·5 howitzer: any larger

or heavier weapon would affect the ability of all the types of machines to move and operate as one unit. It is essential for this purpose that every type of machine must have similar characteristics in the matter of speed, circuit of action, mobility, etc.

7. In considering the question of co-operation between tank forces and other arms, the function of an army operating against guerilla forces must be borne in mind. It will doubtless always remain true that the main objective of any force must be the defeat of the enemy forces in the field, but it does not follow that this end is best achieved by direct attack upon these forces: it may be best arrived at indirectly, as by an attack upon the enemy's brain, or organizing forces, or on his morale, or material possessions, or supplies. In guerilla warfare we must presume that the enemy is largely without a brain to attack, and that whatever weapons are employed the best indirect method of reducing the enemy's morale and power to sustain the conflict will be by material damage to his resources. Whatever weapons are employed the chief feature of guerilla warfare, perhaps, is the ability of the enemy to disperse to places difficult of access for an organized force, thus making the actual and direct destruction of the enemy force in the field a matter of extraordinary difficulty. These difficulties increase in direct proportion to the size of the attacking force, especially if such force is dependent upon animal or human muscular power for its means of progression and maintenance. It is contended that a mobile column of tanks will have a greater opportunity of directly destroying the enemy forces in the field than a comparatively immobile and, of necessity, much larger force of infantry, cavalry, artillery, etc. But, as in guerilla warfare, the chief means of reducing the enemy to terms must be the indirect method of material damage to his resources, the main comparison between a mobile tank column and an expeditionary force composed of infantry, cavalry, artillery, etc., must be based on the capacity of either force to effect material destruction. In this respect the tank force has every advantage in speed, ease of manœuvre, ability to maintain itself for long periods in enemy country without communications, and thus in its ability to work material destruction.

Any attempt at co-operation between the mobile tank and infantry or cavalry will merely produce an ineffectual mixture, possibly, in some ways, increasing the effectiveness of the infantry, but hopelessly limiting the capacity and scope of the tanks: for infantry to co-operate with tanks, for instance, the pace of the machines must at once be reduced to, say, three miles per hour, giving the enemy ample warning of the approach of the forces, and ample opportunity to disperse or escape.

There is only one existing arm with which a tank force can effectively co-operate, and that is the Air Force, which co-operation can only increase its effectiveness by providing it with extended vision and improved facilities for communication. In all probability the operations of a mobile tank column should be entirely directed from the air.

8. In one sense the foregoing does not mean that tanks will replace other arms. It can equally well be argued that the other arms are

retained, but their effectiveness is increased by the substitution of protected machinery of movement for unprotected muscle. Because an 18-pounder gun, for instance, is mounted on an armoured caterpillar machine it does not mean that artillery as a weapon is discarded, but merely that its effectiveness is enormously increased by the substitution of the engine for the horses and the caterpillar track for the wheels.

9. The composition of a tank mobile column, and the method of its use in a punitive expedition against guerilla forces in undeveloped country, would naturally vary considerably with the conditions.

In the early part of this year I had the opportunity of visiting the forces operating in Waziristan, and as an illustration of the substitution of tanks for other arms the following table shows an imaginary tank force intended to operate over the identical route taken by our forces in Waziristan and intended to accomplish precisely the same ends. The number of machines estimated for total fifty, made up as follows:—

Type.	Number Operating.	Number in Reserve.	Totals.
Machine Gun ..	8	4	12
Trench Mortar ..	8	4	12
Supply ..	6	4	10
Tender ..	4	2	6
Signal	2	2	4
Ambulance ..	4	2	6
			50

No artillery machines were thought to be necessary for the objectives to be attacked. Details of this imaginary force are as follows:—

Machines.		Crews.		M/c Guns.		Auto. Rifles.		Trench Mortars.		S.A.A.		Trench Mortar Bombs.		Capital cost of equipped Machines.
Type.	No.	Ea.	Tot.	Ea.	Tot.	Ea.	Tot.	Ea.	Tot.	Each	Total	Ea.	Tot.	
Machine Gun	12	3	36	2	24	—	—	—	—	10,000	120,000	—	—	
Trench Mortar	12	3	36	—	—	1	12	1	12	2,000	24,000	50	600	Average
Supply ..	10	2	20	—	—	1	10	—	—	2,000	20,000	—	—	say
Tender ..	6	6	36	—	—	1	6	—	—	2,000	12,000	—	—	£3,000
Signal ..	4	3	12	—	—	1	4	—	—	2,000	8,000	—	—	each.
Ambulance ..	6	3	18	—	—	—	—	—	—	—	—	—	—	
	50		158		24		32		12		184,000		600	£150,000

The method of operation of such a force would be: Firstly, careful aeroplane observation of the ground to be traversed. Secondly, advance by the column, keeping in constant touch by aeroplane and wireless with the base, to the objectives, which were in this instance the principal villages of the enemy tribesmen. Thirdly, the destruction of the villages and fortifications at point blank range by the trench-mortar machines. And, fourthly, the threat to destroy other villages, and the destruction, if necessary, of crops, herds, cultivation, and irrigation systems, all of which could be effectually accomplished by such a column. Time, I am afraid, prevents going into much further detail as to the operations of such an imaginary force, but it is asserted with confidence that such a force could do all these things with ease, rapidity, and practical immunity. The operations outlined would have taken about five days, instead of the best part of a year, and the cost would have been a mere fraction of the expenditure involved in the actual expedition.

10. The common objections to the use of tanks for guerilla warfare may be summarized as follows:—

That the enemy will not attempt to oppose the machines, or offer themselves as targets, but will disperse to inaccessible places. I think the answer to this objection is that it equally applies to any force that is obviously superior to the enemy. If, on the other hand, the attacking force is only equal in strength to, or weaker than, the enemy, the ambushing and destruction of the force is a probability and has been the fate of many punitive expeditions.

Another objection raised to the use of tanks against guerilla forces is that because the enemy will disperse on their approach, and that they can therefore only effect material damage to his resources, an independent force of tanks must fail to bring about a successful termination of hostilities. The answer, I think, is that against guerilla forces it is agreed that the chief function of the machine will inevitably be the destruction of enemy material resources, but that no conceivable force of any description can do any more. If an enemy in undeveloped country declines to accept combat, then no practicable force of any description can make him do so, and, possibly, short of the permanent occupation of the territory, the control of the frontiers, and the prohibition of the manufacture or importation of arms, nothing will effect a settlement excepting the indirect method of material destruction of his resources. As an illustration of this, the closing stages of the war in South Africa and punitive expeditions on the Indian Frontier might be taken as examples; gas and aeroplanes were unknown in the days of the South African War, and I believe gas has never been used on the Indian Frontier, both would doubtless help, but gas in sufficient quantity to be really effective in thoroughly destroying the enemy would, even if practicable, be an impossibly expensive method of killing off the entire population. Aeroplane bombing has also been demonstrated under such conditions to be very expensive and largely ineffectual. Therefore, the objection that tanks cannot deal with guerilla forces by directly defeating enemy forces in the field applies with equal or greater force to other arms.

Objection is raised to the use of tanks on the grounds that though, if co-operating with other arms, they might be of assistance they would be an additional expense which might or might not be compensated for by bringing hostilities to a speedier close. The answer to this objection is, I think, that, for the reasons given previously, co-operation with other arms should never be attempted, but that, used independently, the economies can be so enormous as to be hardly comparative.

Particular objection to the use of tanks was repeatedly made to me when studying the question in Waziristan. I was repeatedly told that unless tanks could negotiate hills they would be of no avail. The country, as many of you doubtless know, is very hilly or even mountainous, the routes through it being confined to the narrow valleys formed by the beds of streams and rivers from which, as a rule, the hills rise precipitously on either side. It may be said at once that whatever may be in store in the future no conceivable tracked vehicle can at the present time negotiate the precipitous sides of the hills, which are the chief feature of the country. The answer to this objection I found to be that for a tank force to do all that can possibly be accomplished by a force made up on existing lines, there is not the slightest necessity to attempt to negotiate the precipitous hillsides referred to. On the present system a force operating in Waziristan advances into the country along one or other of the river beds, and the force itself makes no attempt to scale the heights—small parties are sent out on to the hillsides to establish picquets for the sole purpose of protecting the column from sniping while passing along the river bed. The only difference between the tank force and one organized in accordance with custom, is that these picquets are no longer required—all that it amounts to really is that the armour plate of the machines is an effective substitute for the picquets, and this means an enormous saving in energy and life. It was found in the latest expedition into Waziristan that the casualties arising from the establishment of the picquets were very much higher than in previous expeditions; the reason for this being given as due to the fact that the enemy were much better equipped with modern rifles. When the time comes, as it must do, that the enemy is completely armed with modern rifles, or even machine guns, the arrangement of picquets along the line of advance of a column will become almost impracticable. While it is agreed, therefore, that it is quite out of the question for a tank force to advance into such a country as Waziristan by any other route than the valleys or river beds, this can be no valid argument against the employment of it because no other force can do anything more, or in practice ever attempts to. As regards the valleys themselves the modern tank can negotiate them with far greater ease than any type of force yet used on the Indian Frontier, the river beds in fact make, on the whole, an excellent roadway for tracked vehicles.

11. For practical purposes and for considering comparative costs it will be useful perhaps to divide the tanks into two broad groups—fighting machines, and supply machines. To compare fighting machines on an economic basis is extraordinarily difficult; it is also

complicated by the necessity for comparing them tactically if we are to arrive at the true measure of their comparative effectiveness. If, on the other hand, we compare supply machines with the present method of supply in undeveloped countries it will, I think, be a simple method of illustrating the comparative effectiveness of the mechanical fighting machine and the muscular one. Existing methods of supply are almost infinitely varied, of course, and for this reason, and because I have a number of reliable figures, I have based the comparison on data derived from the Waziristan force. Transport on the Indian Frontier has always presented enormous difficulties, but as far as the methods and material available at present are concerned it is probable that it is worked as efficiently and economically as is practicable. It is obvious that a pack animal of some sort must be the basis of comparison; the animal used in Waziristan was the camel, which of all pack animals is probably the most efficient when working under conditions suitable for it. If any accurate comparison between the cross-country supply machine and the camel is to be made, the method of comparison is most important. For example, in normal peace conditions the camel feeds to a large extent on the country through which it travels, obviating the necessity for fodder being any appreciable portion of its load. In times of war and in enemy country the camel is dependent, however, on fodder carried, and the distance over which it can operate becomes very restricted. It cannot be said, I think, that the conditions as regards supply which obtained with the Waziristan force were in any way peculiar or exceptional, and therefore the actual figures and distance form a basis for comparison which probably cannot be bettered. The line of communications for the Waziristan force really started from the broad gauge railhead at Darya Khan, a distance of about 120 miles from Khaniguram, but because it would have been impossibly inefficient to pack transport for this distance, the line of communications for the first 80 miles consisted of a motor road, and light gauge railway, built, of course, at enormous expense for purely military purposes. The last 40 miles of the line of communications from Khirgi to Khaniguram being through enemy country and up the bed of a river pack transport was inevitable, and camels were used for this section, the camel load being 400 lb., and the daily consumption of fodder being 22 lb. The work required to be done by these camels was the maintenance of about 6,000 troops at Khaniguram; the number of camels employed was 7,383, these camels consuming over 72 tons of food a day, and because of the necessity to protect this line of communications, approximately 23,000 troops and personnel for working the camps were distributed over the 40 miles. Had this work of maintaining 6,000 troops at a distance of 40 miles been undertaken by a suitable cross-country supply vehicle carrying 3 tons, the number of machines required would have been ten, and the daily fuel consumed would have been about 200 gallons of petrol, and not a single man of the 23,000 troops on the line of communications would have been required.

So much for the economies which can be effected in the supply organization. The total economies if both supply and fighting services

are mechanicalized can be inferred, I think, if we remember the figures for the Waziristan Expedition. It absorbed along the last 40 miles only of the line of advance, that is, *excluding* the base at Khirgi and the 80 miles line of communications to Darya Khan, nearly 30,000 troops, over 7,300 camels (these eating food to the weight of over 72 tons daily), and the preparations and operations occupied the best part of a year. What the cost was I do not know. I asked for figures at Simla but I did not get them. It must, of course, have run into many millions of pounds. I suggest that a mechanical force such as I have outlined of fifty tanks could replace this unwieldy bulk of unprotected muscle, could do all that was done by the infantry, and much more besides if necessary, and that the active operations at any rate would have been over in a few days.

DISCUSSION.

LIEUT.-COLONEL C. F. H. GREENWOOD: Colonel Johnson has told us of the advantages that would be gained by the use of tanks and the large numbers of men that would be saved. He said that it would only take 150 men to run 50 tanks. I am sure that cannot be all the men that would be employed, and I think it would be very interesting if Colonel Johnson would tell us how many men there are *behind* each tank. At the lecture given here last week Major-General Burnett-Hitchcock told us that the average field gun, although it required a crew of only four men to actually fire it, had 54 men *behind* it to enable the gun to be worked—bringing up ammunition and so forth—and in a similar way I think it would be rather interesting to know how many men there are behind each tank. From what I saw of the tanks two or three years ago there seemed to be enormous camps and very few tanks. The tank camps were much more luxurious than any infantry camps; they seemed to contain a much larger proportion of well-paid staff sergeants and such like, but there were very few tanks. I think Colonel Johnson must have some particulars which he has not told us. It was very interesting to hear the optimistic views the lecturer has with regard to the tank, and I have not the slightest doubt that a lot of good will come from the tanks in the future, but I had the unfortunate experience to be what was called a P.B.I., and I know that at High Wood the tanks were unfortunate; it was their first appearance. At Cambrai it could be seen that the tanks did most wonderful things, but the unfortunate part was that after they had gained ground they were not capable of holding it. The question we have to consider to-day is whether in Waziristan and other parts they would be capable of holding ground if they took it. The only other time I came across the tanks was in front of Ypres in wet weather, and there again they did not help things very much. If Colonel Johnson could give us a few more details about the number of men that are required behind the tanks it would be very interesting information.

MAJOR-GENERAL SIR CHARLES DOBELL: I do not know whether I understood the lecturer correctly, but I think he began by saying that Canada, South Africa, Palestine and Mesopotamia were undeveloped countries in which we would only be likely to meet a comparatively badly-armed enemy. I am inclined to think that is a bold statement. If ever we are so unfortunate as to have to fight in Canada we shall find that the enemy will be well armed. During the late War we had artillery against us in Mesopotamia and Palestine, and also in the third Afghan War of last year; in South Africa, too, we might conceivably be opposed by artillery. I therefore think the lecturer's assumption is rather too general. As regards the use of tanks in frontier operations, I am sorry I had not the pleasure of meeting Colonel

Johnson when he was in India, as I commanded in the Khyber from May, 1919, until January of this year. I really do not think that in that country tanks would be of much use. We went right through the Khyber to Dakka, in Afghanistan, in May, 1919, and we certainly had to attack the enemy in positions against which infantry only could operate. The lecturer suggests that columns do not have to attack occupied positions in such warfare. At the Bagh Springs, near Landi Kotal, the enemy held a position early in May, 1919, and the infantry were obliged to turn him out. That is typical of the procedure in all mountain warfare. I think tanks could be very usefully employed in frontier warfare to provide covering fire. By virtue of their armour they could come into action in comparatively exposed positions; but they could not, as a rule, approach the enemy's position. There is one more point I should like to refer to. I have never been to Waziristan, but I know the rest of the frontier fairly well, and I cannot imagine the tanks going up to Khaniguram and effecting the surrender of the enemy, unsupported by infantry, nor do I think that the tribesmen would ever let them come back. It is all very well to say that they would be able to go up the river beds, but I think the roads and the tracks would have to be improved before they tried it.

Brigadier-General Kirke, C.B., C.M.G., D.S.O.: I do not think we ought to try and damp the enthusiasm and the optimism of the lecturer, because without enthusiasm and optimism there would not be any progress. The hypothetical scheme which he has outlined to us to-night is really based on two assumptions: firstly, that we shall have a tank which is capable of doing the work which he has suggested; and, secondly—the point which Sir Charles Dobell has referred to—that material damage will bring about the surrender of these particular people. I should think, from all the accounts of the operations I have read, that the latter assumption is probably very doubtful. I have always understood that it is necessary to kill a certain number of tribesmen before they find the game is not worth the candle. One point on which I agree with the lecturer is, that the tank will probably be able to exert a far greater material effect than aeroplanes appear to have done, for I understand that the aeroplane bombing was comparatively ineffective. The lecturer's proposal for an all-tank expedition really is that tanks shall in themselves combine the functions of all arms. I am not prepared to say that this may not be possible in the future, but until it is definitely proved by the production of a tank which can do all the various things he suggests, I think it will probably be wiser to stick to what we have always been taught, namely, that success is only achieved by the co-operation of all arms. The lecturer has quite frankly stated that at the present time he has not got a tank which can do these things, and that it will be some time before such a tank is produced. I suggest, therefore, that we must keep a very clear distinction in our minds between facts and fancies, because the expert enthusiast is always rather apt to confuse what he hopes to do in the future with what he actually can do at any particular moment.

Lieut.-Colonel P. Johnson, in reply, said: Colonel Greenwood raised the point about the crews totalling 158 men for 50 tanks. Of course, that does not include the men behind. As I expected, we have got back again to the Mark I machine. There must be a number of people present who saw Marks I to V machines operating in France, who also observed the large numbers of men who had to be maintained behind the lines in order that the machines should have a chance, perhaps once in two or three months, of going into the fighting line. That position was perfectly appalling: few have any idea of what it amounted to. The Mark IV machine, which was that used at Cambrai, could not be relied upon to do more than twenty miles without a very considerable proportion of its transmission being completely renewed. Every time the machines were to be used the

final drive had to be renewed to ensure a life of twenty miles. It could then be relied upon to go into the fight and do twenty miles running, but that was all. In the Mark V machine the cost of spare parts alone for 1,000 miles of running was between £7,500 and some larger sum, or between, say, £7 and £10 per mile. This figure does not include the cost and work of putting the parts into the machine —it is merely the cost of material. The immense amount of labour, personnel, and organization thus required gives one an impression of hopeless inefficiency, and that is absolutely correct. If we had nothing better now than the machine used in France we could give up the idea of tanks altogether. But the advance made, experimentally, at any rate, since those days has been extraordinary. I regret that there is no time to go into the subject at length, but the machine I roughly specified as suitable for cross-country supply work or fighting purposes in undeveloped country can be taken as having approximately, if not actually, the degree of reliability, ease of repair, and so on, which applies to an ordinary motor lorry working on a road. That is the sort of comparison you have to make now. As regards rear organization, there must naturally be a considerable number of men. I do not suggest that an expeditionary force of 50 tanks could be run by the 158 men required in the machines themselves. I daresay there would be several hundreds at the back of them, and others farther back still, perhaps. Sir Charles Dobell raised the question of the machines meeting a highly-organized and thoroughly-equipped enemy. I purposely at the beginning of the lecture excluded that point from consideration because the subject would become too complex for a short lecture. If gas, aeroplanes, anti-tank weapons, and so forth, have to be considered, the proposition becomes entirely different. Specifications and ideas would have to be altered, and it is altogether a much bigger question than that dealt with. I referred to Canada as being an undeveloped country only in the sense that it is not well supplied with means of communication and in no other sense. Regarding the reference to the Indian Frontier, I followed the route of the Force advancing to Khaniguram, reaching there three or four days after the column first arrived, and I think I am correct in stating that the route was exactly as it was when the column passed over it, the river bed had not been altered or modified in any way. Now I believe there is a motor road very nearly up to Khaniguram, but it was only being thought about in February last. That river bed is a perfectly impossible proposition for a Mark I or Mark V machine weighing 30 or 35 tons, but I am not suggesting anything of the sort. When I refer to the tank now I mean a machine which has been demonstrated experimentally to be practicable, not to any actual machine in existence at the moment. General Kirke referred to the actual killing of the tribesmen. Nearly everybody I met on the frontier assured me that it was necessary to kill the tribesmen in order to effect the settlement of any tribal war. From discussions, and such statistics as I was able to collect, however, I formed the conclusion that the tribesmen only accepted combat when they wished to do so. That only on those occasions when the tribesmen thought they had a chance of getting some rifles, or killing some of their enemies, did they ever attack the forces advancing into Waziristan, and only on those occasions was there any opportunity of killing them. These conditions, I think, must always govern guerilla warfare. Up to the time I left Waziristan, when operations as far as Khaniguram was concerned were finished, I understood that the final estimate of the casualties to the enemy was 1,000 killed. But I was assured at Khaniguram that this was an exaggeration by about 50 per cent. I should say that the Waziristan expedition attained its ends, not by the killing of 500 men, but by destroying the material possessions of the enemy, by occupying the country with immunity, and thus establishing a sense of hopelessness in the tribesmen. With regard to the possibilities of the tank for India, I was asked at

Simla when some of them could be out there: I replied that it was possible in three years if they were pressed for. What I have visualized will not come about soon, but possibly in the next twelve or eighteen months something tangible will be in existence. The principal features of the machine have been experimentally demonstrated, and it is only a matter of the sometimes arduous boiling down of details to get practical results.

THE CHAIRMAN: Ladies and Gentlemen, I think you will all agree that we have had a most extraordinarily interesting lecture, and the comments that have been made upon it in the course of the discussion have also been very useful indeed. I think myself that Colonel Johnson has done very valuable service by giving us this lecture, because everything has to have a start. This is a highly controversial subject, and I must say I admire Colonel Johnson's pluck in taking it up. As General Kirke said, nothing is ever started until some enthusiast takes it up, and therefore I think we owe a great debt of gratitude to Colonel Johnson for starting this scheme. I am afraid, however, that I cannot altogether agree with the various theories that he has put forward to-day; in fact, I agree with very few of them. Certainly he has given us food for thought, which is a most useful thing, and also opportunities for further experiment. With regard to the second part of Colonel Johnson's lecture, in which he dealt with the question of the production of cross-country tractors for the purpose of supply, I think you will find very general agreement among us all. I think one of the chief uses we have to try and put the tank to is to try and make it of use to our soldiers at the present moment. The lecturer has very properly also tried to look into the future, but we have to look at the present, and we certainly can by inventing a proper cross-country tractor do enormous service to our men now. Anyone who has been on the north-western frontier knows that the trouble we experience there is far more due to the necessity of supplying food and ammunition than to merely fighting the enemy. I do not think anyone who has ever seen it is likely to forget the enormous columns of camels, mules and other animals which follow in the wake of an operating column. All these we hope to do away with, and if we can invent, as we hope to do shortly, a cross-country tractor by means of which we shall be able to bring up ammunition and food close behind the line, I think we shall have made a great step forward. I hope we shall be able to do it. I think that is the first thing we have to start with, and by slow degrees we may possibly, years hence, arrive at the ideal tank column somewhat on the lines which Colonel Johnson has visualized, although I do not think he will ever make the tank replace flesh and blood and the horse. Ladies and Gentlemen, I am sure you will agree with me in offering to Colonel Johnson a hearty vote of thanks for his very valuable lecture to-night.

The resolution of thanks was carried by acclamation.

COLONEL B. C. GREEN, C.M.G.: Ladies and Gentlemen, I am sure you would not like to depart this evening without according a very hearty vote of thanks to our Chairman, Major-General Sir Lynden Bell, for taking the Chair. We always appreciate and enjoy the lectures that are given here; whether we always altogether believe in what is said in them is another matter; and we also always enjoy the comments that are made afterwards by the Chairman. They are always comments which help to elucidate any points which the lecturer has not fully brought forward, and the Chairman always manages to bring out those points to our advantage. Although we may not be quite so optimistic as the lecturer with regard to the future of the tank, we all agree that the development of the tank is in its infancy. We look back to the early days of the motor car and to the first engine that was built by George Stephenson, and in view of what has happened since those times

we cannot help thinking what the future of the tank may be. Its possibilities apparently are enormous. A tank has not been developed yet which can help in a North-West Frontier expedition in the way suggested by the lecturer. I endorse the sentiments expressed by one of the previous speakers to-night (Major-General Sir Charles Dobell), having gone through an expedition on the North-West Frontier. In view of that experience I say that a tank would be absolutely impossible there. I allude to the Hanza-Nagar and Black Mountain Expedition, a good many years ago now. I also agree with the previous speaker, and disagree with the lecturer that you have always got to wait for the enemy to attack you there. My experience was that you have got to find and seek him out and get at him no matter what the cost is. I am afraid I am rather wandering from the subject of my proposition, which is to ask you to accord a very hearty vote of thanks to our Chairman for his kindness in occupying the Chair and for the remarks that he has made on the lecture.

The resolution of thanks was carried by acclamation.

THE CHAIRMAN: Ladies and Gentlemen, I thank you very much.

The meeting then terminated.

THE USE OF THE AIR FORCE FOR REPLACING MILITARY GARRISONS.

By WING-COMMANDER J. A. CHAMIER, C.M.G., D.S.O., O.B.E.

(Owing to the absence on duty of its author, the lecture was read by Wing-Commander Gossage, D.S.O., M.C.)

On Wednesday, 12th January, 1921.

Major-General Sir N. M. Smyth, V.C., K.C.B., in the Chair.

THE CHAIRMAN: Ladies and Gentlemen, Wing-Commander Chamier having been unavoidably detailed for duty away from London, Wing-Commander Gossage, D.S.O., M.C., who has assisted him in preparing his lecture, has kindly undertaken to deliver it in his absence. I have much pleasure in introducing Wing-Commander Gossage to you. He has had a great amount of active service experience, having begun the War with the Royal Field Artillery in Belgium and France. From January, 1915, to April, 1916, he was a flying officer and Flight-Commander on the Western Front, principally engaged in co-operation with the Army. Later, in 1916, we find him in command of No. 8 Squadron, co-operating with the VIIth Army Corps in France, and at the end of 1917 he commanded the squadrons of the 1st Wing, co-operating again with the various army corps comprising the First Army. After the Armistice he was posted to the Military and Land Operations Branch at the Air Ministry in close liaison with the War Office. The subject of the lecture is primarily the substitution of aircraft for troops. I have much pleasure in asking Wing-Commander Gossage to deliver the lecture.

LECTURE.

1. Before the War we had an Army and a Navy only, and we could afford to pay for them. Now we have a third Service and the same sized Navy and Army, and have to pay all three at a time when economy is the guiding principle. The Navy and the Army are approximately their previous size, and we have imposed this third Service on them without apparently any attempt to effect a reduction in either of them. An exposition of how the Air Force can prove a saving by replacing the Army in some of the functions of garrison duty is my excuse for trespassing on military preserves this evening.

2. The following are the normal rôles of military garrisons:—

(*a*) *Precaution against internal disturbances.*—A military garrison stands behind the civil power, and its strength is in direct

proportion to possible disturbances. The larger the threat, the bigger must be the garrison, particularly if inhabitants are liable to be swayed by religious fanaticism or any other cause.

(*b*) *To guard against external aggression.*—Excluding for the moment "defended ports," where, owing to the smallness of the area to be defended, the garrison carries out the dual functions of protection from invasion and guarantees internal quiescence, all our garrisons overseas can be concentrated to repel an invader. India from Afghanistan; Mesopotamia from the Turk in the north. Normally, however, they are disposed with a view to the maintenance of internal security.

(*c*) *The temporary occupation of a late enemy country to enforce peace terms.*—Instance, the Rhine, where we are in occupation of points of strategic importance more as a reminder of our power as victors rather than as a direct threat should the inhabitants wish to take up arms once more. The effect of the garrison is really a moral one, and relies for its backing on the prospect of speedy reinforcement.

3. I will now discuss the aspect of the Air Force with regard to these three main functions of military garrisons, but will chiefly concern myself with the first-named—the precaution against internal disturbances—as it is by far the most important of the three. I will therefore deal with it first.

To gain a true appreciation of what the Air Force can do to relieve the military in their task of preserving order, it is necessary to examine what the Army does in this respect.

(*a*) Firstly, the military must be everywhere to show the Flag and provide backing to the Civil Administration. Hence, small isolated detachments, and long and dangerous lines of communication result.

(*b*) These detachments must be ready at all times to nip disorder in the bud or arrest ringleaders. They must be prepared to hold out if disorder does break out and gets beyond their immediate control.

(*c*) A considerable-sized relief force has to be in existence ready to be sent off to extricate detachments when they get surrounded. Lack of communications either by road or rail all assist in causing delay.

Shahroban, Kufa, Rumaitha, Samawa, and two other places were all invested in the recent Mesopotamia rebellion, and all had to be relieved. The Mosul Vilayet and N.W. Persia also were cut off.

To free all these places and administer salutary punishment we sustained a large number of casualties, and had to send reinforcements from India into Mesopotamia to the extent of almost a division and a half.

Our inability to deal with the disorder in its incipient stages was, I make bold to say, the primary cause of our becoming entangled in this costly small war.

4. Now regard the picture from the air point of view.

(*a*) *To be everywhere and show the Flag.*—Look at the table on the map and the circles on it. This shows a distance of 250 miles from Baghdad. An average aeroplane can keep the air for a distance of 450 miles without refuelling—an airship for some 2,000 miles. This is ubiquity, is it not? Not much of the country, therefore, is left without some form of aerial surveillance. The native, in his ignorance (and some Europeans believe this, too), thinks that he alone is being observed, and this adds to the moral effect.

(*b*) *To provide a show of force to back up the Civil Administration and nip disturbance in the bud.* A threat by a Political Officer that he can call up an aeroplane to support his arguments (this he can do by wireless), and the appearance of the aeroplane will cause a salutary impression, provided that the lessons of the power of the long arm of the Air Force are properly learnt. (About this I will speak a little later on.) Propaganda, inviting compliance with demands, may come first, but bombs will follow by day and by night against villages, inhabitants, cattle and crops if terms are not acceded to.

(*c*) *Delay.*—There is no delay—the aeroplane is demanded and it appears. Disturbance is nipped in the bud either by a show of force or by the immediate application of force itself in its most intense form.

Few casualties to the airmen, if any, need be sustained. It is only the lucky rifle bullet which brings the aeroplane down, and as our accuracy in bombing increases, so will the height from which we can attack our objectives—hence the chance of being hit diminishes.

There is also no reason why we should not land a party of troops at the request of Political Officers to arrest ringleaders who are trying to foment trouble. Aeroplanes flying overhead ready to take immediate offensive action on a signal from the ground could overawe the inhabitants during the performance of this operation. This is no flight of imagination—it was actually done in Mesopotamia last August.

(*d*) *Ubiquity.*—As I said before, aeroplanes are ubiquitous. Look at the map once more. The circle showing the average radius of present-day aircraft covers the area occupied by many military detachments. This, however, leads me to the question of Air Force detachments, which I will discuss later.

Economy.

5. I wish now to turn to the economy of the employment of Air Forces in replacement of Military Garrisons, and I would invite your attention to the map.

Look first at the red dots; each dot represents about 500 men. They represent the forces in Mesopotamia prior to the rising of midsummer, 1920. They are scattered all over the country, but, of course, for some very good reason. No one likes detachments at any time on account of the anxiety they cause—food and possibly beleaguerment. For instance, Zakho guards approach from Turkey; Chemchemal is the key to Kurdistan; Kufa overawes the holy city of Nejef.

However, there they are, carrying out the functions which we have considered previously and requiring the large central striking force collected at Baghdad to go off at any time and relieve any of them should it be necessary.

All this involves the presence of some 47,000 fighting men and costs nearly 20 millions per annum to maintain. There were two squadrons of aeroplanes.

Look what happens now.

We place ten squadrons of the Air Force in Mesopotamia, and by the advice of the most competent authorities, who have examined the question on the spot, we can reduce the Military Garrisons to what is represented by the green dots. You will see I have had to cut some of them in half to show 250 men only.

All the Air Force requires are safe bases from which to operate, and the whole country is under their surveillance, and their communications, being in the air, are unhampered.

The danger of isolation to the military forces and the extreme difficulty of the daily maintenance of these outlying posts disappear when the Air Force is employed.

Two hundred men require only 880 lb. weight of supplies each day, and the present-day weight-carrying machines can "toy" with three times that amount.

Modern aeroplanes can also carry ten fully-armed men, and we are designing them now to carry a much greater number.

If, as is usually the case, aeroplanes can land at these outlying posts, reinforcements can be brought up by air, and conversely the posts can be evacuated by air.

All this is a direct saving when you realize that by the normal present-day methods it requires three men on the lines of communication to maintain one man in the firing line.

These ten squadrons and the 7,900 fighting troops, which are represented by the green dots, cost only £10,000,000 a year, and will, it is contended, preserve internal order with facility equal to, or superior to, that exercised by a force which costs twice as much.

Where we cannot afford the more expensive scheme, we should, I think, turn to the cheaper—in fact, we have no choice in the matter. It is forced upon us.

6. After having said all this, you will say: Why don't you carry it out?

My answer is: That, as we are in most overseas theatres subsidiary to the Military Command, we have not been allowed to.

Military commanders only partially appreciate our potentialities, and quite naturally, I suppose, rely on their time-honoured methods of

expensive lines of communication connecting the many detachments which are forced upon them by political and other circumstances. They are somewhat shy of trying something new which they do not quite fully understand. If the military are in the ascendant and primarily responsible for the garrisoning of a country, they naturally will want things done their way, and in so thinking will consequently decide upon what they know about and what is, incidentally, the more expensive method. If, however, you are prepared, or if you are forced, to accept the cheaper method—the virtual preponderance of air units with their superior advantages—you must accept what indubitably accompanies it, and that is, Air Control. At present under the military régime we are only being partially used. The inability of military commanders and their staffs to think in aerial terms leads to this.

The Army must have detachments, and incidentally honour us by asking us to carry out reconnaissance for each one of them; but at the same time they ask us to divide ourselves into "penny packets," too; separated by enormous distances from our bases and sources of supply.

This is bad enough for the military, but consider what it means to a technical Service like the Air Force with its thirty-two different trades in each squadron and 22,000 odd articles of stores in its catalogue. A single bolt missing may put an aeroplane out of action, and just think what you will have to carry with each "penny packet," if each "penny packet" is going to have its own proper proportion of skilled tradesmen and stores.

Of course, each "penny packet" can have these men and stores, but at a price. If, however, economy is to be the ruling factor, it cannot be done, and the Air Force must live concentrated and amongst its essential facilities for maintenance and repairs. It must and can rely on its enormous range of action for its ubiquity and support to military detachments.

From an administrative point of view Air Force detachments are inefficient and uneconomical; from an operational point of view they may well prove a snare and a delusion, and lead to calamity.

7. This present piecemeal employment of aircraft now brings me to the all-important question as to what *is* the correct way to use the Air Force. The lesson which I wish to convey must be learned by all who would employ aircraft; otherwise, trifling with this new weapon of warfare will prove to the users to be reliance on a broken reed, and to the Air Force a blow from which it will take years to recover.

Firstly, the soldier relies unconsciously on the prestige, acquired by the white armies in centuries of contact with natives, to impress them with awe. The Air Force possesses no such tradition. The superstition of the native concerning the "god in the air" commands his respect, until he realizes that the man who flies the aeroplane is much the same as any other white man.

Before he can have a real taste of the fact that the white man can bite equally as well from the air as on the ground he will not grant him the same respect after his first illusion is shattered. Engine failures

and other signs of inefficiency, an aeroplane being shot down by him occasionally, and, most important of all, the irritation and "souring" effect of spasmodic light bombing, will breed not awe and respect, but merely contempt.

To establish a tradition, therefore, which will prove effective, if only a threat of what is to follow afterwards, is displayed, the Air Force must, if called upon to administer punishment, do it with all its might and in the proper manner.

One objective must be selected—preferably the most inaccessible village of the most prominent tribe which it is desired to punish. All available aircraft must be collected at a base from which they can function with all their maintenance and repair facilities at hand.

The attack with bombs and machine guns must be relentless and unremitting and carried on continuously by day and night, on houses, inhabitants, crops and cattle.

No news travels like bad news. The news of the punishment will spread like wildfire. The objective may be changed if it does not spread quickly enough.

Submission will soon be rendered by the rebellious tribe, and in such a short space of time and at such a small cost in money and lives that no real comparison can be made with what would result from a similar punishment carried out by a military expedition.

This sounds brutal, I know, but it must be made brutal to start with. The threat alone in the future will prove efficacious if the lesson is once properly learnt.

Look at the warship which sails into a foreign port when our interests or legation are in danger. Of her own power she is unable to accomplish much. She carries with her the traditional threat of the power of the British Nation, and peace usually reigns once more. So must we have it with the Air Force—the Service aeroplane must command this respect.

What I have described is not mere imagination again. In Mesopotamia recently two of our pilots had a forced landing and were captured. In their report on their release they stated that "It was very evident that the people were in great terror of our bomb raids, and on the morning following our capture the sky was anxiously searched by them."

If spasmodic efforts cause this, what will the real thing produce?

It is no use taking two bites at a cherry—decide on using the Air Force to exercise punitive measures and let the Air Force use their powers in the proper way. It will be cheaper, quicker, and more efficacious in the long run.

My recounting what happened in Waziristan at the beginning of last year will illustrate how air operations should not be carried out, and will no doubt commend itself as a future guide of what not to do.

We had thirty aeroplanes only available, and with these we tried to make an impression on an area of 32,000 square miles by visiting places all over this area. Our offensive action, by reason of the very vastness of the objective, was almost negligible in effect.

Good intelligence should have indicated the best target or targets, and concentrated effort against these would have achieved success. As it was, the value of aircraft was frittered away.

Light is shining, however. I quote from a private letter from Mesopotamia. "We have been going in for massed bomb raids lately with excellent results. G.H.Q. (who were running the operations, mark you!) now realize how futile it is sending out an odd machine to bomb a tribe."

The root idea of the employment of aircraft is to maintain a concentrated Central Air Force, suitable, by reason of its radius of action, for offensive action far and wide, and immediately ready and capable of reinforcing or supplying military detachments from the air, should reliance still be placed on the use of detachments or should their need be imperative.

So far you have only come part of the way with me. Appreciation of the principles of air power and experience of its workings will, I think, cause you to come to the realization of the fact that with aircraft properly used, *detachments can be done away with entirely,* and complete reliance placed on the long arm of the New Service for the efficient preservation of internal order throughout most, if not all, of our overseas possessions.

8. So much for internal security. I will now make a passing reference to invasion and what assistance the Air Force can give in warding it off. Most of our overseas garrisons are primarily located in stations designed to meet the needs of the maintenance of internal security. They must normally concentrate to meet invasion. This requires time.

Here the Air Force can help. They can operate far in advance of our troops, who are making their preparations to meet the invader or awaiting reinforcements, reconnoitring the possible lines of approach of the invading army and carrying out all kinds of concentrated offensive action against his troops and transport, both road and rail, on his line of march. This delay, while proving a blessing to the army awaiting attack, may well prove decisive, as the first rush of the invader is usually the stake on which he banks for his chances of ultimate victory.

9. Lastly, there is the rôle of the Air Force as part of a military garrison occupying a conquered country to enforce peace terms.

In the case of a highly-civilized country the military forces are largely designed to hold strategic points such as bridgeheads, and their presence, though normally out of all proportion to the threat which might be directed against them should the conquered country show signs of taking up arms once more, is a token of the power which rests behind them. Contact is here established with the conquered people, and aircraft can be of little use in reducing the number of troops that can be employed. They can merely be used for purposes of close co-operation with the military forces.

Aircraft as a portion of the forces of occupation in the case of less civilized countries will be of the greatest use where occupation

of the country means that of showing the Flag continuously and impressing the inhabitants with the power of the conqueror.

Aircraft are a constant reminder through eye and ear. A single aeroplane in a single flight can be seen by every inhabitant of 400 square miles of country. In other words, the accomplishment of a vast amount with the minimum of effort.

10. Let me finish with a final word on the more peaceful aspect of what the Air Force can do in reducing the number of military garrisons.

They can be employed as a most rapid means of communication and contact between white officials and the natives they control so well.

Visits which used to take months to complete can be undertaken in a few hours.

The spread of false information and misinterpretation of a political officer's assurances—a cause of endless trouble and the possible source of rebellion—can be checked, as the official version will invariably get round quicker by air than that which is passed by the natives from mouth to mouth, and contorted in the process.

During our recent successful small operation in Somaliland the deepest impression was made on the local chiefs by the fact that the Governor of Somaliland was able to visit them and speak to them at the conclusion of the operations, forty-eight hours after the fall of the Mullah's stronghold. He accomplished the journey from Berbera —300 miles—by air in one day.

DISCUSSION.

MAJOR-GENERAL SIR W. S. BRANCKER, K.C.B.: Mr. Chairman, Ladies and Gentlemen, the chief reason that I wished to speak was that I anticipated the gallant lecturer would be heavily attacked by the Army, and I desired to support him, but apparently there is not going to be an attack. I honestly think this is almost the best lecture I have ever heard on aviation, and I have heard a good many. It opens up an extraordinarily interesting problem for the future. I agree with practically every word the lecturer has said, except that he has dealt only with the immediate present and not very much with the future. I believe that in the near future he will be able to extend his 200 miles radius to a 500 miles radius, as we improve and develop engines and get better designs; this is almost within practical politics now. There is another point I should have liked to accentuate if there had been any critics, namely, that although we were over four years at war it was only in the last year that aviation really began to come into its own as an independent weapon. Critics may very well say: "You claim this, that, and the other for aviation now, but why did not you do it during the War? You could not carry out accurate bombing, and you had no serious effect on the movements of troops on the ground during the fighting in France." In 1918, however, things were just beginning to develop; and if you take France alone, there was an example of the checking of a German advance in April, 1918, by the concentration of all available aircraft flying low, and there were one or two instances in the German retreat where the Germans lost very heavily from independent aircraft attack. Then both during the advance on Jerusalem in Palestine and during the big operations at the end of the campaign, aviation acting independently had a tremendous effect on the enemy's retreat; while in India, in 1919, an Afghan force was practically stampeded by action from the air or the threat of action from the air. There has been a good

deal of criticism about aerial operations in India since the Armistice, and I think the lecturer hit the nail on the head when he said that the bombing there was spasmodic. One of the bedrock principles of the application of force, not only in aviation, but in naval and military operations as well, is the concentration of all available force at the decisive point, starting with some definite plan and going through with it with every machine or man that you can possibly spare. I think the apparent failure of the Waziristan operations was largely due to the lack of perseverance and concentration of force at really important points. I do not think I can say any more except to congratulate the lecturer very heartily on having so ably opened a subject, which will carry us a very long way in the next twenty years.

MAJOR G. G. WATERHOUSE, R.E.: I should like to put one question to the lecturer, namely, how does he propose that we shall establish the Air Force tradition in a country that is administered by us? We have the tradition and the prestige of the British Army behind us, but can we afford to establish this new tradition, say, in Mesopotamia by going " all out " for some tribe? This Air Force tradition is itself a hypothesis; we do not know that we *can* establish it. We have seen on the frontier the way in which the natives have become used to the aeroplane; they quickly learned how to camouflage themselves and their stock from attacks; and you must remember that a native village is not very susceptible to a bombing attack. The lecturer himself said that the superstition of the aeroplane would go, and the fear due to its novelty would go with it, and knowledge of how to escape it and how to minimize the effect of bombing will very quickly develop. Taking it that we do establish some form of tradition, I think we are still up against the question that if the tradition fails, if we cannot adequately establish it, how is the Air Force going to deal with tribes who are not in open rebellion but who are merely causing trouble to their Political Officer? The method that is adopted at present is that a military expedition is sent up to overawe the tribe. On the other hand, the Air Force can only cope with that tribe by hitting it and keeping on hitting it. Therefore, if tribes cause a little trouble we are to do our best by means of the Air Force to wipe them out! That seems to be rather the Hun method than the method on which the British Empire has been built up, and on which the British Empire will undoubtedly be maintained in the future. I should, therefore, like the lecturer kindly to explain a little more definitely on what he bases, firstly, his feeling that the tradition will be established, and, secondly, failing the establishment of that tradition, how he proposes to deal with a vast country in which the tribes on the east may hear nothing of the punishment which has been inflicted on the tribes on the west, and so on.

COLONEL H. E. T. KELLY, C.B., C.M.G.: I should like to say a word on behalf of the Army, as nobody has said anything in support of it yet. Wing-Commander Gossage's idea is very attractive, but nevertheless I do not see how you are going to do away with the poor old Army. First of all, the establishment of the aerodromes will be a very big show. The Air Force will have to get a lot of their gear out by rail or by carriage in some way, so that you cannot do away with the necessity of having a military force to start the thing. They will have to open a line of communications in order to get the aerial bases settled. It must also be remembered that when the aerodromes are established they will prove to be very vulnerable. One of the chief difficulties of attacking villages, towns, and so on at some distance is the difficulty of keeping a permanent watch over that particular spot. To keep one aeroplane in the air all day on an ordinary patrol requires, I think I am right in saying, six aeroplanes. So that if you are always going to keep watch over a particular disordered spot it may take a tremendous lot of

aeroplanes to do the work. General Brancker says that if you bomb at all you want to do it in force, so that there again it means a very big show indeed. I think, as the last speaker said, that directly the aeroplanes go away their effect is rather forgotten. Even the natives are becoming accustomed to the effect of aeroplanes, and are beginning to learn how to take care of themselves. So there is a good deal to be said from the point of view of the difficulties that will arise in their use. I know Waziristan very well; it is most unsuitable for the employment of aeroplanes; it is full of difficulties, and I can quite understand that the wily natives were not very much upset by them. Our Indian frontier is covered with that very difficult sort of country. Afghanistan, too, is very rugged, and offers a lot of difficulties to aeroplanes. If you do everything from a base at a distance of a couple of hundred miles, I maintain that you rather lose your effect owing to the intervals of time between attacking squadrons.

AIR COMMODORE BROOKE-POPHAM: There is one point I would suggest might be thought of, and that is the co-operation of tanks with aeroplanes. It seems to me that the use of tanks might very well do away with the necessity for a line of communications and thus tying the central portion of your Air Force to a road, river or railway. You could get tanks to move fairly quickly across country to bring up supplies, protecting themselves during the journey, and they would probably be able to defend the aerodromes when they reach them. Two of the speakers have referred to people getting used to aeroplanes and not being afraid of them any more. I maintain that that was not the experience of the War on the Western Front. As far as I can make out, the more people were bombed by aeroplanes, or even heard them over their heads at night, the more they got worried about them, and I rather fancy that was the same in London, although I was not here. There is one little point about thinking aerially that I should like to refer to. We are used to walking along the road at four miles an hour and only moving in two dimensions, and it is very difficult for people suddenly to alter their brains completely and to think in three dimensions at two miles a minute, which is what the aeroplane does. One often hears even people who have been in the Air Force for a long time say: "I could no more do that than fly." One brings it out quite unconsciously. It shows that nobody's brain has yet become properly attuned to thinking aerially and thus realizing what the potentialities of the Air Force are.

COLONEL B. L. ANLEY: I should like to ask the lecturer one question. I think he said there were twenty-three different trades required for the upkeep of an aeroplane. At a former lecture delivered at this Institution on the subject of man power it was mentioned that even at the present moment the Royal Air Force has extreme difficulty in getting these specialist tradesmen. I should like to know whether there is any possibility of maintaining one hundred aeroplanes at present, for instance, and not in the future, as the lecturer was dealing with the present and not the future.

WING-COMMANDER GOSSAGE, in reply, said: Mr. Chairman, Ladies and Gentlemen, first of all I want to deal with the point which Major Waterhouse raised. I entirely agree with his remarks on the subject of the traditions of the British Empire compared with those of the late Imperial German Empire. I feel sure that we cannot exercise this threat until the occasion occurs. If a state of unrest develops which warrants intense aerial action, then I think we ought to use it. He is quite right, no doubt, in saying that news of what happens to the tribes in one portion of one of our overseas possessions may not spread to the tribes which inhabit another portion of it. I grant him that. But if news does not travel as he suggests, I do not think that the outbreak of revolution in, say, the east will necessarily cause

a similar outbreak in the west, and therefore I think that within the bounds of the normal means of inter-communication of the native countries the effect of the lesson will be learned. If punishment is administered in one portion of a locality, the surrounding villages which would normally break out into rebellion in that locality will hear about it soon enough. One has to localize things. It is not necessary to administer a lesson in, say, the west, if the people in the west are not going to break into rebellion when the people in the east do. Both Major Waterhouse and Colonel Kelly referred to the frontier of Afghanistan. That was an instance which I quoted in the lecture as being almost a failure from the air point of view.

With regard to the question of the despatch of a column (of which Major Waterhouse made mention), which goes out to support a Political Officer if he gets into trouble. I do not see the slightest reason why the Air Force should not carry out that function. As I said before, they can carry the troops, and I think that would be an instance in which they would be most useful. If the Political Officer wants assistance which does not warrant intense bombing operations carried out by aircraft, they can quite easily be employed in landing troops. The main thing is to give the impression of ubiquity and speed. If the Political Officer asks for bombing action, give it him at once; if he asks for troops, send them to him at once. That brings me to the question of the employment of troops, a subject to which Colonel Kelly referred. I said that here we must have troops. We want 7,900 of them in Mesopotamia to guard the aerodromes of our ten squadrons. It is much better to have them as shown on the map on our basic lines of communication, where there is very little risk of their being cut off from one another. A certain number of troops are shown on the map as attached to Baghdad—3,400. Those are required to reinforce the various detachments which, it is considered, should still remain as outlying posts.

I want to make it quite clear that the scheme which I have illustrated on the board is what I consider to be a halfway-house scheme. We have made a concession to the military here by saying: "Very well, you can maintain detachments at the places where the green dots appear on the map. If you have to maintain them there we say we can keep them supplied and also keep constant watch over them."

Ten squadrons were suggested to guard against the difficulty which Colonel Kelly suggested of having six aeroplanes behind the line for every one on the line. Ten squadrons with their active machines have got their requisite reserves. The reserves which we keep at the present moment are 150 per cent. machines reserve, and we send out 100 per cent. wastage each year to all these overseas possessions; so that I think we can guarantee always to have, at any rate, 50 per cent. at least of these machines serviceable for action. The other point which I wish to impress again is that if we are going to keep any of these places at all we are faced with the question of keeping them in the cheapest manner, and I make so bold as to say that the air is a cheaper means of preserving order in a country than the present expensive military method. With regard to the question of trades, which was raised by the last speaker, I think I am right in saying that the only trades from which we are not easily able to obtain men at the present time are the wireless trades. If you give us the money and the opportunity I do not see the slightest difficulty in maintaining the hundred aeroplanes only to which the speaker referred. If you have the money and the opportunity it can be done.

THE CHAIRMAN (Major-General Sir N. M. Smyth): Ladies and Gentlemen, it is usual for the Chairman to endeavour to summarize the results of the discussion. There are two points that struck me particularly in the very interesting lecture that has been delivered and the remarks that have followed it. I think the *argumentum ad crumenam*, or the argument of the purse, is one of great importance at the

present time, and will bear weight with the Treasury and the public. It therefore seems to me that some endeavour should be made to carry out the principles which have been proposed by the lecturer. It appears to be desirable that, as this is purely an experiment, the proposals should be tried in their entirety in one district only, and, if possible, in Mesopotamia. At the same time we must guard against the danger of injuring women and children and non-combatants, a point which was hinted at by Major Waterhouse. I think it is most important that in fighting against such people as Arabs, who are very highly civilized and fight as gentlemen always, we should avoid waging war upon non-combatants. With regard to the moral effect of aeroplanes upon natives, it seems to me that we do not need to trouble much about that. It may be of use to send about messengers in the air and to impress the natives with the enormous power that we have in the Air Force, but what we really want to do is in a case of emergency to obtain decisive results by attacking the enemy with every possible means at our disposal.

In conclusion, I propose a hearty vote of thanks to the lecturer, and I ask you to show your approval in the usual way.

The resolution of thanks was carried by acclamation.

AIR COMMODORE BROOKE-POPHAM: Ladies and Gentlemen, before you go I am sure you will join with me in according a hearty vote of thanks to Major-General Sir N. M. Smyth for presiding over the meeting this afternoon.

The resolution of thanks was carried by acclamation, and the meeting terminated.

FINANCE OF THE ARMY.

By Sir Charles Harris, G.B.E., K.C.B.

On Wednesday, 2nd March, 1921.

The Right Hon. Viscount Peel, G.B.E., Under-Secretary of State for War, in the Chair.

The Chairman: Gentlemen, we are assembled here to-day to hear a Lecture on "Finance of the Army" by Sir Charles Harris. Sir Charles, as we all know, is one of the most distinguished public officials of the day, and it is a great satisfaction when you are listening to a lecture on a particular subject to know that there is not and could not be any greater expert on the subject to which you are listening. On subjects of Army finance Sir Charles Harris is really the final court of appeal, and therefore there is about his views an element not of certainty merely but of absolute infallibility. This should, therefore, give great confidence to those who issue from this building knowing the real truth on subjects of Army finance. Sir Charles Harris has made many contributions to the subject. I understand that one of his particular achievements was to introduce a system of ordnance factory accounts, which gave and is giving a great deal of satisfaction, and he is also the real father, through the mouth of the Committee on National Expenditure, of the great new system of costing accounts for the Army which is going to revolutionize the whole of the Army finance. He will no doubt deal with that in the course of his observations. Sir Charles Harris, as we all know, is a very old member of the War Office. To say that he knows far more about the history and working of the finance of the War Office than the whole of the rest of the Army Council put together would not necessarily be extremely high praise, as Sir Charles Harris has a great knowledge and memory of past Secretaries of State and of military members by the score; in fact, Sir Charles lived and flourished long before there was any Army Council at all. His memory, his experience, and his knowledge of the War Office go back into remote periods of the last century, long before the Esher Committee reported or any of these new ideas were put into operation. Therefore, not only is he a present expert on our Army finance but he is so deeply imbued with the history of Army finance in his own person that any statement he makes about the system of finance prevailing either in Tudor times or, we will say, after the Restoration or after the glorious Revolution, may be taken as almost the expressions of personal experience and not merely of historical research. With that introduction, gentlemen, I have much pleasure in introducing our distinguished lecturer, Sir Charles Harris.

LECTURE.

IF an audience has gathered here to-day—for the first time, as I imagine—to listen to the dull drone of finance, the reason is (no doubt) the prominence into which the Great War has brought the subject.

The Crimea, we may say, taught us that the rearward services of the Army, though less heroic, were not less important than Balaclava charges. South Africa enforced the same lesson as regards transport and medical services. The Great War has shown, and is still showing, that behind the rearward services lies another still less heroic zone, the Home Front, where in the last resort the struggle of financial endurance is fought out in a long-drawn battle that does not end with the Armistice. And on the Home Front, as it seems to me, the foremost lesson of the War has been to re-establish those truths of political economy which, before 1914, men were boasting that they had relegated to Saturn; and in particular to demonstrate the true nature of money: that it is not in itself a force or power capable of being indefinitely multiplied, but is rather a directive of the real power, which is human effort or, as we called it in the War, man-power. For a time came when, though money in the shape of Bradburys and Bankers' Clearings was more abundant than ever before, man-power was exhausted, so that we could not get the most necessary work done except by taking labour away from other necessary work; and we all realized that to compete for labour in the ordinary business way, by weight of money, was sheer folly. We could not increase the supply of labour, but only make it more and more costly, and indeed a point was easily reached at which more money meant less work, owing to the increase of lost time and other manifestations of human weakness. To-day this essential truth about money has again slipped into the background; but it still remains a fact that Government expenditure means the diversion of man-power from that reproductive industry which alone can make good the colossal waste of the War. Fleets, armies, aircraft, education are all good in themselves so long as you can afford them, but as we stand to-day the total of all such expenditure is inevitably limited, and the only road to efficiency lies in such a control as will get the best possible value for every pound spent. This brings me to a definition of my subject. Army finance is the system of control applied to expenditure on the Army.

In this definition I assume that the control is to be exercised in a rational way, worthy to be called a system; but at the moment there is a cry for "economy with the broad axe"—for limitation of expenditure without reference to the value obtained for it. That is, indeed, better than no limitation at all, and is, in fact, a reversion to early Parliamentary methods, but it is quite irrational, and not to be dignified with the name economy.

Asking myself what aspect of this wide subject would have the best chance of interesting this audience, I bethought me that my position would be rather like that of an airman invited to address an audience of people many of whom he had himself been in the habit of bombing. Such an audience, it seemed to me, would be less interested in the theory of the stability of aircraft than in the properties of bombs and the choice of targets. Accordingly, I propose to avoid, as far as possible, purely financial technicalities, and to speak rather of the points at which finance impinges upon Army administration.

The control of Army expenditure is exercised by three separate bodies: Parliament, the Treasury, and the War Office; and I will take them in that order. To begin with Parliamentary control, its essentially mediæval methods can only be understood by glancing at history. When war was brewing and the personal income of a feudal king was insufficient, he came to Parliament to authorize a tax, and the money collected was paid over to the Lord Treasurer, one of the great officers of the King's Household, and merged in the rest of the royal revenues, which it was the duty of the Lord Treasurer to husband. That is the origin of the Treasury control of to-day and the reason why all the money voted by Parliament is still in form granted to His Majesty; and though such money was long ago separated from his personal property, even now it can only be disbursed under an Order signed by the Sovereign placing it at the disposal of the Treasury. Parliament in early days concerned itself with two things only: to keep the taxes as low as possible, and to see that money voted for a war was honestly spent on prosecuting the war; and even before Tudor times it frequently demanded special accounts of expenditure to satisfy itself on this latter point. Events in the reign of the Merry Monarch caused Parliament to fear that money voted for ships might be either dissipated or spent on maintaining that hateful thing a standing army for the oppression of the subject, and at the accession of William of Orange the Act of Settlement laid down definitely that "the raising or keeping a standing army within the Kingdom, unless it be with the consent of Parliament, is against law." A compact was made that Parliament should fix the strength of the Army and find the money, while the King should have its government and discipline, rewards and punishments. That is the meaning of the Annual Vote for the numbers of the Army: a formal recognition that an Army is an unconstitutional evil, only to be authorized for a year at a time; and that is also why the sole authority for the rates of pay and allowances of officers and men is a Warrant signed by the King. Moreover, that is why an account called an Appropriation Account is annually presented to Parliament, to show that the money voted for the Army has in fact been duly *appropriated* to the service of the Army and nothing else.

The next stage was the use of the power of the purse to secure political control. For instance, to prevent intimidation of the peaceful citizen at election times, and so on, Parliament thought it necessary to restrict the movement of troops. The plan it adopted was to place the money voted for the Army in the hands of a Member of Parliament called the Secretary at War and to lay down that no transport could be requisitioned or troops billeted on the march without a route signed by him. These rude forefathers of ours were in deadly earnest, and if the unfortunate Secretary at War had allowed any movement of troops threatening the liberty of the subject, he would have found himself impeached with the risk of being shortened by a head. As late as 1837, the Duke of Wellington declared that "the Commander-in-Chief cannot move a corporal's guard from London to Windsor without going to the Civil Department for authority; he must get a route."

Observe that, so far, we do not touch economy at all. Parliament left the efficiency of the Army and its administration to the King; it wanted to keep the Army weak and cheap, and to control policy through its power of refusing to vote supplies. If there was anything in the King's administration it did not like, it could bargain for amendment before it passed the Votes—redress of grievances before grant of Supply, as it is called. And the archaic forms of Parliamentary procedure appropriate to this state of things are still in use to-day. When Army Estimates are before the House of Commons in Committee of Supply, the last thing anybody attempts to do is to examine the figures in the Estimates as bearing on economy of administration or anything of that kind. The debates consist almost entirely of discussions of pure policy and the airing of grievances, which in these days almost always take the form of demands for more money for somebody or something, though owing to another hoary fiction a Member can only ask for more by proposing to vote less. There is current a very dangerous half-truth—that policy determines expenditure. Of course, that is true in a sense. If you could clear out of Mesopotamia and Palestine, bag and baggage, you would save a lot. But in the sense that, provided your policy is well-founded you can leave your expenditure to look after itself, it is completely untrue. Administration begins where policy leaves off, and administration may be economical or extravagant to any degree. Economy means the science of the ordering of the household, and in that domestic sphere policy may be said to lie in the regulation of the size of families; but do not let anyone pretend on that account that economy is merely the Greek word for birth-control.

The Appropriation Accounts presented to Parliament had been audited by Members of Parliament or other persons specially appointed from time to time, but in 1866 Gladstone passed an Act which set up a permanent Comptroller and Auditor-General to audit continuously the accounts of all public departments, and a standing Parliamentary Commission of Public Accounts to consider his reports on the accounts. Under the same Act the Treasury appoints an officer in each Department called the Accounting Officer, who is personally responsible to Parliament that the accounts are duly and punctually rendered, and is called before the Public Accounts Committee to answer for them. In the War Office that very real responsibility falls to my lot. The Accounting Officer has to give a formal certificate to Parliament on the face of the account that no part of the expenditure in it was incurred without authority superior to that of the department—that is, Treasury or Parliamentary authority—where such authority is required by regulation. To give him real personal control of the regularity of expenditure he is invested with a power of veto; that is, he is charged, of his own authority, to refuse to make or allow any payment which he considers irregular, and only the Secretary of State, by personal order in writing, given or confirmed after considering the Accounting Officer's objection, can override the veto. If he does so, the Accounting Officer must pay, and then himself report the matter to the Treasury and Auditor-General. That is a position of considerable strength, but

we are still in the realm of regularity as distinct from economy, and we all know how easy it is to be extravagant in strict accordance with regulation. The regulations lay down that various classes of expenditure must be approved by the Brigade Commander, the General Officer Commanding-in-Chief, the Army Council, the Treasury or Parliament. So long as the expenditure is honest and the person by whom approval is given wears the right uniform or sits in the right chair, the Accounting Officer, as such, can be as gaily extravagant as anybody, and has no power to curb extravagance in others.

The form in which Estimates and Accounts are to be laid before Parliament is prescribed by the Treasury. In the case of the Army, as I shall explain later on, the form has been radically changed in the last two years, but for the present I am dealing with the traditional form, even when I use the present tense. The Estimates are divided into fifteen votes: Vote 1, Pay of the Army and kindred charges; 2, Medical Officers, Nurses and Medicines; 3, Special Reserve; 4, Territorials; 5, Educational Establishments; 6, Quartering, Transport and Remounts; 7, Supplies and Clothing; 8, General Stores; 9, Munitions and Technical Engineer Stores; 10, Lands, Works and Buildings; 11, Miscellaneous charges; 12, War Office; 13, Pension charges for Officers; 14, Pension charges for Men; 15, Pension charges for Civilians. Each of these Votes is divided into sub-heads, it may be twenty or more: and many of the sub-heads are further divided into items. The Estimate shows in parallel columns the amount required for payment within the year against each sub-head and item, and the corresponding amount in the Estimate of the year before. It gives no explanation whatever, but it is customary for the Secretary of State to issue with it a Memorandum dealing with policy or with important features of the programme of the year.

The Appropriation Account shows in parallel columns the amount voted under each sub-head or item, and the amount actually paid out, with brief explanations of the differences between estimate and expenditure. The main purpose of the account, as described in the Standing Orders of the House, is to show how far the money granted in a particular vote was in fact appropriated or spent under that vote. The expenditure is therefore so classified in the accounts and estimates that a paymaster when he makes a payment can at once put it down against its proper vote, sub-head and item. Take an important thing like coal. It may be used to warm a hospital, to cook the soldiers' rations, to drive a pumping engine in waterworks or machinery in an engineer or ordnance workshop. The paymaster when he pays a bill cannot tell for what purpose the coal will be used, but he knows that coal is fuel, so down it goes under "Fuel and Light." Again, if you take electric current for barracks from a town main somewhere, the bill goes down as light; but if you have your own generating station the coal goes down as coal, the machinery, mains, lamps, buildings and wages of civilians go down to other heads, and if soldiers are employed their pay, rations, clothing, barracks, and so on go down in the accounts exactly as if they were cavalry or gunners, so that the cost of lighting

is so absolutely hidden all over the Estimates and Accounts that all the auditors that have ever existed could not find it.

The Estimates and Accounts, in fact, have no meaning in the sphere of economy; and the explanations in the accounts consequently tend to be equally meaningless: "The deficit is due to an underestimate of requirements," or something like that. "The bankrupt attributed his bankruptcy to the fact that his expenditure had exceeded his income." The uselessness of the whole plan is plainly shown by the fact that if you can foresee just how extravagant you are going to be, the expenditure agrees with the estimate, and there is no need for any explanation at all. Parliament accepts the expenditure because it accepted the Estimate. It accepted the Estimate because it had accepted a very similar Estimate the year before. The world is supported in space by an elephant, and the elephant stands on a tortoise, and what the tortoise stands on you must not ask.

But Parliament does in some matters get into touch with economy through the action of the Comptroller and Auditor-General. His officers sit in the War Office and read all the papers on which financial questions are discussed and action taken, and though, of course, he cannot invest the meaningless Parliamentary Accounts with meaning, he can pick up from the papers points calling for criticism and bring them out in his report to Parliament. His strict concern, as an auditor, is with regularity; but by an extension of his functions, which has come to be generally accepted, he is able occasionally (though long after the event) to make disclosures, the fear of which has the same wholesome influence in the field of economy as the fear of a modern post-mortem might have had upon the Borgias.

One other point in connection with Parliamentary control is important. Originally there was one Vote for the Army, set out for the information of Parliament under various heads. Appropriation consisted in seeing that money voted for the Army was not spent on the Navy, or rather vice versa, for the Navy was beloved of Parliament while the Army was hated. But in 1842-3 these heads were presented as separate Votes, to be separately passed by the House. As it happens, there were fifteen of them, in addition to the Vote for numbers, just as in 1914: Vote 1, Charge of the Land Forces, covering Pay, Allowances, Clothing, Forage, Fuel and Light, Lodging, Hospitals, Horses, Movement of Troops, Regimental Schools and Miscellaneous Expenses; 2, Staff Officers; 3, Public Departments (the Horse Guards or Commander-in-Chief's Office, the War Office or Secretary at War's Office, and the Chelsea Commissioners); 4, Royal Military College; 5, Royal Military Asylum and Hibernian School; 6, Volunteers (which then meant Yeomanry); 7 to 15 were various Non-Effective Votes covering the same ground as 13 to 15 in the Estimates of 1914. You will have observed that there is no mention of rations: the soldier in peace paid for his food out of his shilling, while in war the Commissariat and Transport Department of the Treasury took over those duties. There is no mention of arms or works, which were in the separate Ordnance Department, or of the Militia, which was under the

Home Office. These services only came under the War Office at the time of the Crimea. And each regiment supplied itself with fuel and light, forage, and so on, while the colonel farmed the clothing for such profit as he could make out of it.

The consequence of making these divisions of the Estimates into separate Votes of Parliament was that each became a watertight compartment; that is, no saving on one Vote could, in the eyes of Parliament, cover an excess on another. Thus the absurd position was liable to arise that the War Office, with a hundred thousand pounds unspent on its Votes as a whole, must come to Parliament for a fresh grant of £5,000 on some one Vote. To escape this absurdity the House, by Act of Parliament, authorized the Treasury to give provisional authority to transfer money from one Vote to another, provided the total of the Army Estimates was not exceeded, subject to formal condonation later by an Act of Parliament called the Appropriation Act, which annually records the final appropriation of the money under the several Votes. This was a new departure of great significance. The historic function of Parliament was to control the Lord High Treasurer, the King's Officer, in his handling of public moneys. It had now adopted him as its own General Manager, subject to formal confirmation of his acts. So far as watertight compartments may be thought to mean control of expenditure, Parliament had in principle surrendered its control, for the Treasury is as much the servant of Ministers as the War Office itself; and to-day the doctrine is fully developed that while Parliament retains the formalities of control, the realities, so far as they exist at all, reside in the Treasury only. This, I may say, was the subject of debate in the House last Friday.

Let us then pass to Treasury control; and if any observations I may make under that head seem to savour of criticism, let me say at once that I yield to nobody in my conviction of the necessity of such control or in my admiration of the extremely able way in which the methods we have inherited from our official ancestors are applied. Treasury control is purely arbitrary, i.e., it is just what the Treasury chooses to make it, and springs from the inherent duty and power of the Lord High Treasurer to make whatever rules he thought necessary to secure that the King's treasure was thriftily spent. The War Office can no more question it than the under-housemaid can dispute the orders of the housekeeper. We are at last in the region of economy, with a plain obligation to get good value for the expenditure and not merely to limit the amount.

One of the most important functions of the Treasury is to think of future years. It is very easy to start expenditure this year which can be got within the compass of this year's Votes, but which will involve a great increase in years to come. For instance, an increase of numbers or of rates of pay taking effect late in the year—laying down a battleship in March—a grant of pensions which may not produce its full effect for twenty or thirty years, and so on. Another important function is the co-ordination of different spending departments, for a concession made to (say) the Army at once gives rise to claims from

the Navy and Air Force; and, in fact, the essential conditions of the life of the soldier and the airman are so similar that the War Office and Air Ministry in administrative matters may be said to run an eternal three-legged race, with results that are occasionally disconcerting to both parties. Generally, all forms of expenditure which, once set up, continue from year to year, such as Establishments, rates of pay and pensions, come under Treasury control in detail, and the same is true of large building services which, once begun, also pledge future years. But other classes of expenditure, such as purchase of stores of all kinds, employment of temporary labour, and so on, can more easily be limited each year on their merits, and in these regions Treasury control tends to take the form of an intensified system of appropriation or limitation by watertight compartments. After the Crimean War, when the Commissariat, Ordnance and Militia Departments had been pitchforked into the War Office, a Clothing Department was started, and it with the Commissariat and Ordnance Departments took over from the Army all the expenditure on material, so that the scheme of Army Votes was remodelled on departmental lines. The great Vote which covered practically all the expenses of the regiments of the Army was broken up and the expenditure reclassified, very logically on the whole, according to its nature and not according to its purpose, producing a scheme very like the Votes of 1914, which I read out just now. Parliament had made each Vote a watertight compartment: the Treasury capped this by making each sub-head, and in some cases each item, a watertight compartment, on the principle (I suppose) of *divide et impera,* until there were some hundreds of these little compartments within the total Estimate. Thus, with contracts running for rifles and machine guns, if the contractors sent in rather more rifles than was expected, and the machine guns lagged, it was necessary to get the authority of the Treasury to use the surplus (as it was quite wrongly called) on machine guns to pay for the extra rifles. Of course, all restrictions of this sort put some drag on expenditure; and the more watertight compartments there are the more little balances there will remain unspent to go back to the Exchequer for the reduction of the National Debt. From a purely technical point of view, no doubt such bunkers add to the interest of the game, and I am not now advocating their abolition or even that of the dead stymie which the Treasury is now and then able to lay us; but in sober reality the attempt to get economy by intensifying the principle of appropriation, which (as I have shown) is really a principle of regularity only, is not in fact successful. If I may here repeat words in which I have elsewhere spoken disrespectfully of the equator, it "belongs to a primitive level of administrative thought, in which the mechanical impounding of casual balances takes the place that should be filled by a vital striving after economy."

Another great weakness of Treasury control is that, being based on cash Estimates and pure cash accounts, it can have no grip on the consumption of stores. Once money has been converted into stores of any kind it disappears from view in our published accounts just as if it

had been thrown into the sea, and for all the Treasury can tell, you can do what you like with the stores (except give them away or sell them) until the time comes when you want more cash to replace them. But it is *consumption* that is the disease—the consumption of stores, I mean —while the want of cash to replace them is merely a symptom of it. Indeed, in these respects it may be said that Treasury control is rather like eighteenth century medicine: it attacks the symptoms rather than the disease, and relies very largely on regular bleeding of the patient.

And, lastly, Treasury control generally takes the form of the War Office asking in advance for authority to do this or that. It is essentially control of good or bad intentions, and often has little application to the actual facts. I do not for an instant wish to suggest any analogy between the Treasury and another place where it is popularly said that great weight is placed upon intentions, but we all know how wide may be the difference between the prospectus and the dividend warrants; and owing to the meaningless character of the public accounts, the Treasury has little opportunity of finding out what actually happens as regards economy, though the Comptroller and Auditor-General takes good care that it hears of any breach of regularity.

Coming now to the War Office, its first duty in the matter of control is, of course, to convert the rulings of Parliament and the Treasury into formal detailed regulations for the Army and to secure obedience to these regulations. This necessarily involves a very high degree of centralization in all matters of which the Treasury takes cognizance; and so long as Treasury control retains the character I have sketched, there can be no substantial measure of decentralization in financial matters. I will return to this point later. But first I should explain the internal organization of the War Office for financial purposes. The several Votes for Supplies, Clothing, Ordnance, Works, and so on are administered by the Military Members of Council through the Directors of these services, that is, within the limits fixed by regulation and the Parliamentary Estimates, they determine what expenditure is to proceed and when. To help them in this task, each Military Member has attached to his department one or more branches of my department, the heads of which are called his financial advisers. They keep the necessary records of liabilities incurred and of expenditure and give him their advice, for what it is worth, on the financial aspect of any subject under consideration, so that he may be fully informed before making up his mind. At the same time they see, on my behalf, that financial limits and regulations are observed, and that reference is made to superior financial authority when required. Where no question of regularity is concerned, the Military Member may follow their advice or not, as he sees fit, or he may if he desires consult me before proceeding. In the preparation of the Annual Estimates, the Military Directors and financial advisers work together from the first. Then the Military Members one by one discuss and settle with the Parliamentary Financial Secretary of the War Office and myself what money is necessary on each Vote for the maintenance

of the Army in the coming year, and what proposals for new forms of expenditure—new services, as they are called—should go forward for final consideration. When all this has been done, and the total for Army Estimates fixed by the Cabinet, the Military and Financial Members of Council hold a meeting with the C.I.G.S. in the chair, at which the sum available after providing for maintenance is distributed over the new services in order of military importance, subject to any instructions the Secretary of State may see fit to give. Then the Estimates are put into Parliamentary form and sent Vote by Vote to the Treasury for approval before they can be laid before Parliament. The keynotes of the organization are, as you see, that there is the closest possible association between the military and financial sides throughout and at different levels in the hierarchy, and that, within the total, the military authorities decide the priority of different services, and actually order the expenditure after the Votes are passed. Thus, Army finance does not stand for the control of the Military Departments of the War Office by the Finance Department, but for the control of expenditure by the Army Council as a whole.

The fact, mentioned just now, that the Treasury and Parliament have little or no control over the expenditure of stores, as distinct from the money spent in buying them, makes it all the more necessary for the War Office to exercise such control. The variety and the value of such stores are enormous. There are now at least 80,000 to 100,000 different items of which formal accounts are kept in quantity, and rendered to the Comptroller and Auditor-General for audit. But except that the Comptroller attaches to his report on the Army Cash Account a report on these Store Accounts, the Parliamentary Accounts contain no trace of the existence of this voluminous and complex accounting, for the simple reason that, unless you reduce this vast variety of things to the least common denominator of money, you cannot condense the transactions into a form which any mind can grasp. At the present time, with the enormous stocks over from the War, we could live riotously for years, and yet, because we should not be buying, we should appear to Parliament to wear the white flower of strictest economy. But, in fact, the War Office gives itself infinite trouble about all these things. Not only are they strictly accounted for while in store, but after issue to the troops they are accounted for again in Supply Accounts, Barrack Expense Accounts, Equipment Accounts, and I know not what other accounts of the same type; and there are regulations laying down in minutest detail everything that a battery of artillery may hold, from its guns, carriages and harness down to so many ounces of pins, mixed; what beef, bread, sugar, etc., each man may have, so much hay and corn for each horse, so much practice ammunition for each kind of unit, so many buckles, rivets and scraps of leather for the repair of harness and saddlery, and so on. And my officers not only audit all these accounts but periodically test them by counting or weighing the articles actually in possession, and see that the responsible officer is called over the coals by his military superiors if anything is missing. But, for all this, the greater part of

the consumption of stores cannot be really regulated in this detailed way, and though we have done our best on this plan, one can feel little confidence in the reality of the control when once things leave the storehouse.

To sum up, then, we had under the perfected Gladstonian system:—

Parliamentary Control, which, except for control of policy and discussion of the points taken by the Comptroller and Auditor-General a year or more after the event, has remained almost purely formal, giving limitation of expenditure by appropriation, without any reference to economy of administration.

Treasury Control, highly effective as regards establishments and personal emoluments, at the cost of complete centralization; and in other matters limited to cash expenditure and directed to intensified appropriation by watertight compartments rather than to economy.

War Office Control, necessarily determined in form by the superior controls to which it has to conform, but striving to replace appropriation by a live financial criticism of administration in daily working, and doing its imperfect best to control stores as well as cash.

Just one word about the human being at the other end of the chain: the Army officer to whose actions all these controls are addressed. What of him? Well, for the most part he is happily unconscious of any intelligible meaning in the whole business. He learns his regulations and accepts with what philosophy he may the daily torrent of fresh instructions that are always making them obsolete; but so far as any sense of intelligent co-operation in the distant result is concerned, his position may best be described as that of a gunner carrying ammunition to a long-range gun of which he does not understand the mechanism, firing out of a deep gun-pit into the dark.

The dominant characteristic of the whole scheme, outside the War Office and to a large extent inside it, too, is an attempt to get economy out of a machinery constructed for regularity only.

More than a century ago, in the infancy of steam, a Cornishman called Trevithick constructed a pumping engine for mines, the most obvious feature of which was an oscillating beam by which the motion of the piston was communicated to the pump. It was simple, cheap, durable and so successful that Trevithick engines were in use comparatively recently if they are no longer to be seen to-day. Mounted on a trolly, with the addition of a simple gearing, such an engine was capable of producing locomotion, after a fashion, and I believe that in fact one of the early locomotives was something of that type. One cannot help reflecting that, had our railways been nationalized from the beginning, Trevithick's beam might still be visible in the engines that draw our trains to-day. In the realm of financial machinery it is this beam of detailed appropriation that I would see removed from the Parliamentary and Treasury eye.

In the Great War there were in reality no Army Estimates, though for the sake of regularity the Parliamentary squad was put through the motions of the manual exercise (as an old-fashioned drill-sergeant might

say) by being made solemnly to vote £1,000 under each of the fifteen Army Votes. There could be no better demonstration of the depth of formalism to which Parliamentary control has sunk. The real voting took the form of Votes of Credit, for hundreds of millions at a time, which were not even appropriated to Army, Navy or Civil purposes, but were drawn upon indiscriminately by all alike. As there were no Estimates, there could be no control by appropriation, and it may be said that the War blew the beam of Trevithick's engine to smithereens, and the whole thing clattered down on the scrap heap. Those of us, soldiers and civilians, who tackled the job of attempting to control the expenditure of the War, went into that fight with no weapons and with hardly even a stick in our naked hands.

Pondering in advance on the problems of after-war reconstruction, I asked myself whether we could not leave Trevithick on the scrap heap and construct something on more modern lines; and I took the opportunity of laying a comprehensive scheme of modernized control before the National Expenditure Committee of 1917, which, after consulting eminent professional accountants, approved the scheme and recommended it for adoption in the public service generally and in the War Office to begin with. Apart from some suggested changes in Parliamentary procedure on Estimates, which have not so far been adopted, the basic principle was to abandon the attempt to control by nests of watertight compartments of cash and substitute control by units of cost. Instead of classifying the expenditure in estimates and accounts by formal subjects or classes, such as pay, food, fuel, buildings, you classify it by objects or purposes which present some meaning that the mind can grasp. In this way you get all the items that go to make up the cost of a cavalry regiment—pay, food, horses, forage, clothing, barracks, and the rest—brought together in one account, which gives you the cost of the regiment. In another account you get the cost of (say) a mechanical transport company, and thus arrive at the cost per ton-mile of the work it does, and so on. By this plan you can compare the cost of similar units one with another and see who is running his business economically or extravagantly; or, again, you can see at a glance from the estimates or accounts what it is costing to garrison a particular area, so that the Ministers or Members of Parliament who have to hold the balance true between the British taxpayer who gives, and the Arab, Turk, Zionist or Egyptian who receives, may at all events know by how much in terms of cash the giver is the more blessed. The figures in the Estimates and Accounts, in fact, begin to have a real meaning, and to throw a very penetrating light on the merits of the policy as well as the administration that lies behind them; and this light—much of which is almost as new to the War Office as to the Treasury or Parliament—promises to be of the greatest value towards a really rational control of expenditure.

Of course, this system requires something better than the archaic accountancy of the past. If you are going to show the cost of anything, you cannot suppress all mention of your debts at the end of the year and show only your actual cash payments. You cannot leave out

of your accounts entirely the value of the stores and materials of all kinds you consume but do not pay for within the year; and you cannot draw half a million's worth of stationery from another public department, use it up, and never even ask what it cost. I will not trouble you with account technicalities, but for reasons such as these we had to face a considerable development of accounting, and we found it necessary, before starting the new plan, to get together a small corps of skilled accountants to do this technical work. That done, we started on the 1st of April, 1919, and the completed accounts for the year 1919-20 are now in the press for publication.

In this new form of Estimates and Accounts there is only one Vote for the Army, showing the total cash to be included in the Budget. There is, therefore, no formal appropriation within this total, but the Estimates set out seven heads, covering not only the cash payments of the year, but all the items that go to make up cost. The seven heads are: 1, Maintenance of the Standing Army, including not only pay and allowances, but clothing, horses, accommodation, stores, travelling, etc.; 2, Territorial and Reserve Forces; 3, Working Expenses of Educational Establishments, Hospitals, Store Depots, Factories, etc.; 4, War Office and Command Staffs; 5, Capital Accounts, including New Buildings, Land, and Stock Accounts of all sorts; 6, Terminal and Miscellaneous Charges; and 7, Pensions. Under each of these main heads there are sub-heads for the various units and establishments concerned, each working as far as possible to some appropriate unit of cost, such as a regiment, battalion or battery under head 1, the patient-day in a hospital, ton-mile in a transport unit, ton handled in a store depot, student-day at an educational establishment, and so on. Also under head 1 the units of the Army are grouped geographically so as to show the cost of the forces at Home, in Mesopotamia or in any other area. And the Accounts follow the arrangements of the Estimates.

But the great innovation is this—that whereas formerly there was practically only the one cash account at the War Office, which nobody in a Command ever saw until it was presented to Parliament, and which even then had no meaning whatever for any particular Command, there is now an actual account made up month by month for every unit and establishment under the eyes of its Commanding Officer. From these accounts a combined account is built up under the eyes of the Administrative General in each Command, and from the Command Accounts is built up the total account at the War Office. Everybody has, therefore, at his elbow an account showing just what is being spent under his charge and responsibility, and how the units of cost are coming out month by month.

Having got that into working order, our next aim is to get by means of it a system of real responsibility for expenditure in the shape of cost—results, all down the line, and then to simplify regulations. about details, give a man a reasonable degree of freedom, hold him to the results, and judge him by them. Then we shall be in the way to accomplish the ideal of all Army administrative reformers for the last

twenty-five years—a real measure of financial decentralization without producing financial irresponsibility. Repeated attempts to do this under the old system failed; because the man at the centre, responsible to Parliament and the Treasury for the correct appropriation of expenditure in each of hundreds of watertight compartments, could not possibly give the man at the circumference a really free hand so long as he had no means of knowing what use that particular man was making of his freedom. And in time of war the machinery of control of expenditure at Home will continue to function without collapsing because there are no Parliamentary Estimates.

There is a lot of work still to be done before we attain this ideal, because nobody in the Army has as yet any experience of administering by actual results instead of by regulations and intentions; but a Committee is now sitting under the chairmanship of Sir Travers Clarke, who has throughout been a keen supporter of these developments, to consider the reform of the administrative machinery in these respects, and I hope this will lead to a considerable simplification in regulations, the scrapping of some useless accounts, the establishment of effective responsibility, a natural selection of the fittest among administrators, and finally a real economy in Army expenditure, by which I mean the production of a given military strength for a smaller sum of money. All that sounds a good deal to expect from a changed system of handling figures, but I am already constantly getting evidence of a new attitude to economy in the Army. Officers in every sort of position, when shown their expenditure and the results obtained for it measured side by side, are cutting down superfluous expenses, £10 a week here and £100 a month there, not in reluctant obedience to orders but gladly of their own initiative. I do not mean that the new accounting limits itself to small savings like these, though the sum total of them will be very considerable. In the hands of superior authority it is an engine of very great power; but these are the economies volunteered by those in charge of minor establishments beyond the ken of the War Office. And they are pure gain. Any ill-informed person can come along and say "reduce the Army by so many men." If that is done in consequence of a change of national policy which reduces our military commitments, it is economy; but if not, it may be following the lead of the young man who vowed on the 1st of January that he would economize and henceforth spend no more on food than he was able to spare from whisky and cigarettes. Administration is the art of carrying through your policy without overtaxing your resources, and it is our first duty as administrators to see that no stone of economy is left unturned, before we sell the Army unit by unit and man by man to pay the interest on our debts.

It is said in some quarters that the nation cannot now afford this elaboration of accounts. The criticism is misconceived. The accounts are such as business firms keep for no other reason than that it pays to do so, and nothing in my experience leads me to suppose that Government expenditure stands in less need of such checks than business expenditure. The adoption of cost accounting in the large number of

Auxiliary Hospitals that were opened during the War was completely successful, and enabled us, with an almost completely decentralized system, to make savings of public expenditure running into millions. It is to me a first principle that accounts that do not pay for their keeping should go. The cost of the new department that keeps these accounts works out for the current year at ·3 per cent. of the expenditure it handles. There is some little additional work thrown upon other departments of the Army, at a cost not easy to ascertain. But if the change does not save many times this percentage of the expenditure I shall be ready to admit failure. On that score I have no fear, because, to use a favourite word at the present day, we are getting the system of control into accord with psychology, and that is the sure foundation of success. We are appealing to one of the strongest motives of conduct in men of any practical ability—the pleasure of contriving something visible, even if it be only an economy.

This is my profession of faith. Treat the Army officer as a rational being. Let him see the result of his actions; encourage him to measure himself against some other man who is doing the same job, or against his own past record. Instead of leaving him in the dark about the cost of things and ordering him to see that they are dealt with strictly in accordance with paragraph 637 of the Regulations for Red Tape Services, as amended by Army Order 234 of 1917 and Army Council Instruction 3570 of 1920, let him know what things cost and invite him to co-operate with you in a sensible economy of the nation's wealth. Do this, because the letter killeth, but the spirit maketh alive. Do this, and after a long official life spent (or, as some of you may think, mis-spent) in criticizing the extravagances of generations of Army officers, I say, with complete confidence, that they will not fail to respond to your appeal, "being neither children nor gods, but men in a world of men."

DISCUSSION.

LIEUT.-COLONEL R. DAUBENY, C.B.E.: My Lord, Sir Charles Harris, and Gentlemen, it is with some hesitation that I rise to speak after our distinguished lecturer, who is my own ultimate Departmental Chief at the War Office. Howbeit it is with no idea of criticism at all that I venture to make a few remarks, if I may be permitted to do so. It would indeed be a bold man who would argue with the lecturer on Army finance; it would require the bravery of horse, foot, artillery and the Royal Air Force, too. I think the lecture has shown us what an extremely interesting study Army finance may be. The whole mighty structure and organization of the British Army is ultimately to enable Mr. Thomas Atkins to put his bayonet through the vitals of his country's enemies, and Army finance, though its connection may not at once seem clear to you, really plays a very important part in that laudable function. Mr. Fortescue, in his wonderful history of the British Army, tells us that the Duke of Wellington wrote just over one hundred years ago: "The British soldier always fights well, but the influence of regular pay is seriously felt on their conduct, their health, and their efficiency." At that period a very small proportion of the troops had families at home. During the late War this dictum was exemplified to a far greater degree. It may be said that the happiness of many, many thousands of families depended upon the prompt way in which they received

the separation allowances voted to them by Parliament, and the soldiers themselves were strengthened in the performance of their arduous duties under unexampled difficulties by the practically sure knowledge that their families were being properly looked after at home. We know also that the final debacle of our enemies was, to a considerable extent, caused by the discontent at their home front, and the constant complaints received by soldiers from their wives and dependents very seriously affected their efficiency. For the most part the families in our own homes were contented with the substantial allowances they drew regularly each week at the post offices, and thousands of letters to the Front testified to this satisfaction. I had the privilege, as Regimental Paymaster of the Labour Corps, of keeping some 800,000 accounts, nearly 400,000 of them being for wives and dependents, and so I was brought very closely in touch with their point of view. My Office and I were pretty freely abused, but even the Paymaster was thanked sometimes, and I once received a splendid bundle of asparagus from a good lady in Wales. The Cost Accounting Branch was not in existence then, or I might have had difficulty in costing this receipt. I can, however, assure you that it was duly "appropriated" and appreciated. Another good lady—or perhaps the word "good" is hardly suitable—sent me a photo of the latest arrival. As, however, it came out later on that the lady's lawful spouse had not been home to attend to his domestic duties for quite a lengthy period, the photo could not be accepted as a "voucher" for increase of allowance. Sir Charles Harris has not, perhaps, brought out to the fullest extent the great powers he possesses as Accounting Officer of the Army. His powers in this respect are far greater than those of the Accounting Officer of any other department, even greater than those of the Accountant-General of the Navy. If as Accounting Officer he does not approve of any payment, no matter on what account, he cannot be forced to make such payment except with the written authority of the Secretary of State for War given in writing. Not even the full powers of the Army Council assembled in their dignity, or whatever else this august body assembles in, can force our lecturer to make a payment unless he has had, as already stated, the written authority of the Secretary of State for War himself. If the charge is then questioned by the Auditor-General or the Public Accounts Committee, the Secretary of State may find the sum a personal charge against him. No doubt Sir Charles has a very comfortable armchair at the War Office, but occasionally he has to vacate this and give evidence before the Public Accounts Committee, a most important assembly, the importance of which is perhaps not known to very many of the general public. Parliament has always been very jealous of its powers over the public purse, but owing to the many varied forms of expenditure of which it is the grantor it has to delegate the more immediate control to a committee composed of a comparatively small number of persons who have shown particular interest in the financial affairs of the country. This inquest into expenditure and appropriations in aid occurs after the actual expenditure, but is none the less thorough for that, and the recommendations of the committee, after presentation to Parliament, have almost the force of law, and the wishes of the committee are almost invariably carried out. It is guided by an important functionary—the Comptroller and Auditor-General—who is responsible to Parliament alone. The wonderful manner in which Sir Charles Harris faces this zealous committee, and provides it with the information required without delay, has been a source of wonder to many of those associated with Army finance. Probably no man living has accounted for so much public money as Sir Charles Harris, and certainly no man has accounted for money within such a short time of its actual expenditure. It was not so very long ago that millions of pounds of public money spent were not accounted for till many years after they had been actually expended, and consequently to bring home financial irregularities to any individual was a

remote possibility. In conclusion, may I suggest the following words of Bolingbroke as suitable for all those employed in dealing with Army finance: "Doubt is the key of knowledge. He who never doubts never examines; he who never examines never discovers; he who never discovers anything is blind, and will remain so."

MAJOR-GENERAL S. S. LONG: I am sure we all congratulate and thank the lecturer for his very able address, but when he spoke about the Army officer as somebody who took no notice whatsoever of economy, as he did in a portion of his lecture, I think he was uttering an unmerited slander on officers of the Army. Speaking as an officer who has spent thirty-seven years of his life in the Army, I think I can claim, as I do, on behalf of every officer that I have ever come across, that a more economical body of public servants is certainly not to be found in the Civil Service. To be told that we are very ignorant is certainly not borne out when we turn to what Army officers have done in commerce. We find Army officers on the Boards of the great banks; we find them on the Boards of some of the greatest of our commercial concerns; and I further suggest that we do not find other gentlemen of the Civil Service in similar capacities. The Army officer has been attacked by Sir Charles Harris as not paying attention to economy. I claim that he has. I claim that so far as the service of the country is concerned the Army officer has been one of the greatest assets that the country has ever possessed, either in regard to economy or in regard to the protection of the public money. This is a matter that intimately concerns us all. We are told that finance is of great importance. I agree that it is of the utmost importance, but is the finance of the country being administered in the right way? If you look at a commercial concern you will find that the heads of that concern, the directors, are their own financial advisers, obviously because they know every detail of the business. On the other hand, in the Government Service the details of the business are not known by the financial advisers. So far as the military side is concerned, they have not any military knowledge, otherwise they would be made commanders-in-chief or whatever it may be. Obviously the only way in which you can get real financial control in the Army is by the appointment of officers to take charge of financial matters. We have at the present time a man who is a great banker, who yesterday was a military or naval officer, because he understands what he is talking about. At the present time we have financial control in the Army by a body of gentlemen who have no knowledge of military matters. I cannot give you a better example than this: During the height of the war, when we were fighting for our existence, certain gentlemen prepared a most able Minute on the way to run the War, under which the whole of the auxiliary transport out in France would have been done away with, because they said they could not see any necessity for it. That was handed in to the Prime Minister, Mr. Asquith, and the military experts had a large amount of their valuable time taken up writing treatises on military operations, showing that a forward movement would be impossible without the auxiliary transport. In that case financial experts gave advice on military matters, as they do to-day. I maintain that if you want proper financial control in any Government Department you should appoint people at the head who have knowledge of that business through training in the business. It is impossible to get proper financial control by appointing outside gentlemen, however highly they may be educated. Financial control in any commercial concern, whose main business, after all, is the earning of dividends, could not be maintained except by those means.

SIR GODFREY COLLINS, M.P.: If I understood Sir Charles Harris correctly, I do not think he intended, either directly or indirectly, to make any unkind reference to the soldier and the British officer. If I understood him correctly, the new form

of Estimates will place in the hands of the regimental officer information which will enable him to take a more direct and lively interest in the good working of his regiment, and I am here this afternoon to pay my testimony and to express my deep sense of gratitude to our lecturer for the work he has done in that respect, not only in connection with his lecture this afternoon but for the vast amount of spade work he has done in connection with Army finance, especially during the last three years. I am convinced myself that in the stringent days which are ahead of the nation any great Department of State, whether it be the War Office, the Admiralty, or any other department, which can convince the public that they are securing 20s. worth of work and value for every 20s. of public money that is spent will get their money more readily voted by the House of Commons. The new form of accounts, which has already been presented by the War Office to the House of Commons, places in the hands of members for the first time intelligent information regarding the Army, and by giving the House of Commons information you will more readily, I believe, get the House of Commons to vote the necessary money. All those, in any walk of life, who object to information being classified and presented in an intelligent form are generally the least efficient. Efficiency always welcomes inquiry, investigation, and correct facts, and if the War Office lead the way, as they have done, in the presentation of new forms of accounts which Sir Charles and the Military Members as well, have carried into effect, the new forms of accounts will be adopted by every great Department of State. The Admiralty and other Departments will be forced to come into line, and in that way present to the House of Commons, and through them to the taxpayer, direct and clear knowledge as to how their money is being spent. I have great pleasure in testifying to and showing my appreciation of the work which Sir Charles Harris has done.

THE RIGHT HON. F. D. ACLAND, M.P.: I hope it will not go out of this room that Sir Charles Harris made what any person could really justifiably consider an attack on Army officers. I think his whole point was that under the previous system of finance it was really impossible for the officer to be what he wishes to be—anything like an efficient instrument of economy or financial control. If one has even the dimmest contact with or knowledge of the old system one knows that it was almost impossible for the officer to know what the cost was of what he was doing. If he does not know what the cost is of what he is doing, and what alternative methods of doing the same thing will cost, and what economy there may be from doing the same thing in another way, it is quite impossible for him, with the best will in the world, to help towards real economy in the Army. I think there is this also to be said. I have been connected with the War Office, and I should like, if I may, to ask the lecturer a question. I should like to know whether he ever knew of any instance of a man being promoted because he was economical or of a man being refused promotion because he was extravagant? The system did not admit of real effective praise or blame being awarded on account of assistance to economy or the reverse, and therefore it was very difficult, I think, to blame the Army officer if, owing to his limitations, he was not really as efficient an instrument as he might have been in that direction. I think the whole purpose of the lecturer in writing his lecture was to pin his faith to the ordinary regimental and other officer as the most efficient instrument of Army economy, if only he was given for the first time a real live interest in the accounts that he was handling and the expenditure for which he was responsible. The only other question I should like to ask the lecturer is this (I am afraid I am pulling his leg a little bit): Does the new system of Estimates tend at all to produce Excess Votes?

MAJOR G. E. A. GRANET, D.S.O., M.C., R.A.: I think Sir Charles Harris is right in insinuating that Army officers, at any rate during the War, did not have

any great interest in reducing unnecessary expenditure. I know that at that time the absence of any sort of check on stores in the fighting units certainly led to a feeling that no expenditure mattered, and that there was "lots more where that comes from." This new system of cost accounting is the surest method, I think, of combating that feeling now that we have come back to peace and must cut down our expenditure. Sir Charles mentioned the red tape regulations, paragraph so-and-so. I might suggest that they require a certain amount of amendment and improvement. The separation allowances during the War were mentioned, and they were certainly most generous, and now that we have come back to times of peace I think the allowances should be sufficient to provide in kind the things that they are allowed for. For instance, take the lodging allowance; a battery sergeant-major's lodging allowance is, I believe, 9s. 4d. a week, if he is living away from barracks and has no quarters. If he is in quarters he is very well off; if he lives away from barracks he gets only 9s. 4d. a week, and for that sum I know that in a certain town in the north of England it is perfectly impossible for a warrant officer to find accommodation for himself and his family such as he would have in barracks. Then take the case of the officer and his servant allowance. An officer gets a servant; sometimes he gets two if he is a mounted officer. If he goes to take up a Territorial appointment, in lieu of his two servants he gets a servant allowance of 2s. a day; and I defy anybody to produce even a small portion of a civilian servant at 2s. a day.

SIR CHARLES HARRIS, G.B.E.: I should like to make one or two remarks in reply to the points that have been raised. I am afraid I must have expressed myself very imperfectly on the subject of the attitude of officers of the Army to economy generally. What I tried to say, and what I hoped I had succeeded in saying, was that officers as well as civilians threw themselves into the job of controlling expenditure during the Great War, but they found themselves deprived of any decent machinery for doing so, and practically had to go into it with their bare hands. Another point that was raised by Mr. Acland is closely associated with that. He asked me whether I ever knew of a case where a man was promoted for economy or passed over for the reverse quality. I think the answer is "No"; I cannot say that I know of any case, except in my own Department, the Pay Department, where a man was definitely promoted because of economical results. I think it is easy to give at least one important reason for that, namely, that in default of any system of accounts which shows what a man is doing in the way of economy, in default of anything that can be pointed to, the whole thing simply becomes a matter of opinion, and such a matter of opinion in the Army would be very closely allied to rumours of favouritism. When you can point to an account properly drawn up, and audited by the Comptroller and Auditor-General, and say: "Colonel Jones did that. We promote him or the reverse," you will, at any rate, have something to go on which is a solid reason for the action you take. Remarks have been made with regard to the inadequacy of certain allowances. That is a fascinating subject, and it falls within the sphere allotted in this paper to Treasury control; but, if I may say so, it falls entirely outside the purview of this discussion. Finally, Mr. Acland asked me one difficult question—whether the new system of Accounts and Estimates tended to produce Excess Votes. In reply to that, I can only say that if he had not recently deserted and laid down the office of Chairman of the Public Accounts Committee, he would have had the opportunity of listening to me on that point yesterday in "another place."

THE CHAIRMAN: As the hour is late I rise to say a few words of thanks to Sir Charles Harris for his most brilliant paper. Perhaps I may say I have a little

personal acquaintance with the question of whether officers are promoted or not for economy, because as a Territorial officer at the beginning of the War I made an attempt at economy by refusing to pay certain charges which I thought were not payable under the Regulations. I refused to meet some rather greedy demands of some civilians in the neighbourhood, and I received the severest rebuke from Headquarters that I think I have ever received, for attempting to disturb the civil population. I need hardly say that I refused to pay, and I certainly was not promoted for that effort. I entirely agree with what other speakers have said in regard to the lecture this afternoon. The effect made upon my mind by Sir Charles Harris's lecture was that officers in the Army, whatever their natural genius for economy might be, had not had the opportunity under the previous system of exercising their proclivities, but now they will be able to do so. May I remind my audience in this connection that only recently a School of Military Administration has been opened at Chiseldon, in Wiltshire, which does give definite instruction on these matters and on commercial matters to those officers of the Army who are able to attend? I can only say, in conclusion, that I am most grateful, and I am sure all the audience are equally grateful to Sir Charles Harris for the deeply interesting review he has given us of Army finance. To my mind his account of the new system was a most triumphant vindication of it, and I was exceedingly interested to hear from two gentlemen so well qualified to speak of Parliamentary finance that they thought that it would enable the House of Commons to exercise a greater degree of criticism and be more able to enforce economy, which they admitted had not been possible previously under the existing system of Army accounts. Sir Charles, I thank you very much indeed, on behalf of the audience, for your most valuable and brilliant lecture.

AERIAL CO-OPERATION WITH THE NAVY.

By Squadron Leader C. H. K. Edmonds, D.S.O., O.B.E.,
Royal Air Force.

Motto :—

" He who will know what shall be in the future must study what has been in the past."—*Old Proverb.*

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INTRODUCTION.

THE object of a nation at war is to stop the enemy's national life, and the strategic plan which either belligerent follows to achieve this end

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Note.—This was the winning Essay for the Gordon Shephard Memorial Prize, provided by the income from a sum of money placed at the disposal of the Air Council by Sir Horatio Hale Shephard in memory of his son, the late Brig.-General G. S. Shephard, D.S.O., M.C., Royal Air Force.

may be divided into three classes, viz., naval strategy, military strategy, and independent air strategy.

When aircraft are employed for reconnaissance over the sea and in co-operation with the Navy the objectives must be the same as those which are the aims of the naval strategy, hence the use of aircraft against any other objectives comes under the heading of independent air strategy, or possibly military strategy, and is outside the scope of this paper.

Now the object of naval strategy is the control of maritime communications, and the destruction of the enemy's battle-fleet is the principal means to this end. The subject may be conveniently considered under the three following headings:—

(*a*) The Battle Fleet.
(*b*) Commerce protection and prevention of the enemy's commerce.
(*c*) Support of military expeditions overseas.

In Chapters I, II, and III the use of aircraft in the late War in co-operation with the Navy under the above three headings will be examined and some criticisms offered. In Chapter IV the limiting factors of various types of aircraft will be considered in conjunction with the probable requirements of future naval warfare. From this a forecast will be made of "the possible future of the various types of aircraft in a war against a first-class naval power."

Whenever "The War" is mentioned the late world conflict is meant. And the phrase "the future," unless specially stated, refers to the next ten years, for the author considers that the progress of aeronautics may be so rapid as to render impracticable conjectures beyond that period. No attempt has been made to discuss the work of aeroplanes and kite balloons in any detail, as they are not included in the "Definition of Subject" given in A.M.W.O. 915 of 14th August, 1919.

CHAPTER I.

Co-operation with the Fleet in the North Sea.

Evolution of the Aeroplane Carrier.—On the outbreak of war very little was known of working aircraft from ships, therefore the solution of the problem of how to provide aircraft for the Fleet at sea was at once energetically sought.

Two classes of seaplane carrier were tried: a large ship with considerable stowage space for machines and considerable radius of action, and smaller ships with correspondingly less radius and stowage. In the former class was the old Cunarder, the "Campania," for use with the Grand Fleet; and in the latter class were the "Engadine," "Riviera" and "Empress," all three cross-Channel packets.

By December the three last-named ships had joined the Harwich Force, and on Christmas Day, 1914, a successful air raid on Cuxhaven and Wilhelmshaven was made by the seaplanes from them. This

popularized such operations. The three existing carriers were fitted with improved accommodation for seaplanes, and others of a similar class were taken up.

When the refitted ships rejoined the Harwich Force, however, attempts to make similar raids led to repeated failures and disappointments. It was found that the North Sea in average weather was too rough to permit of seaplanes being hoisted out and in. Also surprise was practically impossible because the flotilla on passage to the German coast was almost invariably observed by Zeppelins, which the low performance seaplanes were quite incapable of bringing down. The seaplane carriers, too, had only a speed of about 19 knots, consequently it was very risky to keep them near the enemy's coast once they had been observed. Therefore, the policy of raiding the enemy's naval bases continuously was abandoned, and no more than sporadic attacks were afterwards attempted.

H.M.S. "Campania" joined the Grand Fleet in the summer of 1915. Experience with her, confirming that gained with the Harwich Force, was that the use of aeroplanes from ships at sea was impracticable, that an aircraft carrier must have a speed at least equal to that of the ships with which she works, and that there was a need for both the large and the small class of carrier. Further, this experience enabled the Commander-in-Chief to lay down his aerial requirements for the Fleet at sea as follows:—

(i) To prevent reconnaissance by Zeppelins.
(ii) To reconnoitre the enemy's fleet.
(iii) To spot for gunfire after the battle was joined.

Accordingly the pre-war experiments in flying seaplanes with wheels, or aeroplanes, off the deck of a ship steaming at high speed into the wind were pressed on, and the results were good. In the meantime the possibility of an aeroplane alighting on the deck of a ship under way became recognized, which obviated the necessity of stopping to hoist-in after a flight, with the consequent risk from submarines. The construction of H.M.S. "Argus," with a special alighting deck, began in 1916. In the autumn of 1917 successful trials of landing an aeroplane on H.M.S. "Furious" were carried out, also the practicability of flying an aeroplane off a turret had been proved; and from this date onwards aeroplanes were carried on ships in lieu of seaplanes.

Grand Fleet's Aircraft.—At the time of the Armistice a comprehensive programme for Grand Fleet aircraft was nearly completed. There were two large aeroplane carriers ("Furious" and "Argus") and one small one ("Vindictive"), whilst two more large ones were under construction. "Argus" had torpedo machines, the other carriers reconnaissance machines.

In each light cruiser, except when prevented by questions of stability, a single-seater fighter was carried, whose primary rôle was the attack of Zeppelins.

Each battleship, or battle-cruiser, carried two aeroplanes. These were either single-seater fighters or two-seaters, so distributed that each

squadron of ships had its own 'planes for spotting or reconnaissance, and fighters to protect them.

This use of aeroplanes for overseas flying was necessary, because no seaplane existed which had the necessary performance to permit of flying off platforms, or of landing on a deck, or to bring down a Zeppelin. Nevertheless, there were certain unavoidable drawbacks. Even with air-bags and hydrovanes on the chassis, the strain on the pilots and observers and the wastage of machines was greater than if seaplanes could be used. Also, to keep the personnel in practice, there must be aerodromes, lighters for landing and embarking machines, etc., at each Fleet base. In the War these drawbacks were not prohibitive, because as the oversea flying was only occasional the strain on the personnel was never very great, neither was the wastage excessive, as the aerodromes and shore organization could be easily provided. In peace, however, or in a war where the Fleet was more at sea, the same methods might not work. This matter will be dealt with further in Chapter IV.

Kite balloons were carried in a proportion of the cruisers, T.B.D.'s and battleships, being used respectively for reconnaissance, anti-submarine work, and control of gunfire. Considering that a great division of opinion existed as to the value or otherwise of the balloons, and that shortage of either men or material, or both, was always a difficulty throughout the War, the author considers that once the aeroplane programme was accepted the kite balloons should have been given up, except in a few destroyers for anti-submarine work. Airships of sufficient performance to meet the Fleet's requirements were not available during the War.

German Aircraft in the North Sea.—Having reviewed the development of aircraft with the Grand Fleet, it is appropriate to consider the enemy's naval aerial resources, before passing on to a more detailed examination of their employment. Unlike ourselves, the Germans started the War with an efficient service of large rigid airships, whose primary rôle was the patrol of the south-east corner of the North Sea. They were based on Tondern, Altona and Cuxhaven, and it is no exaggeration to say that in the region of their patrols they held the supremacy of the air. Hence, the German Fleet when at sea in good weather always enjoyed aerial co-operation, the movements of any ships were nearly always screened by airships, whose great radius of action, speed range, and long endurance rendered them capable of this work.

The airship patrols were supplemented by seaplanes from Sylt, Heligoland, a station near Cuxhaven, and Borkum. Flying-boats were not used, but the German float-seaplanes were much superior to our own. They had no aircraft carriers, neither were aircraft carried aboard warships. Presumably the enemy relied on his large airships to fulfil the requirements of the Fleet at sea.

Narrative of Events in the North Sea, with some observations and criticisms.—A brief review will now be made of the work of the Grand Fleet and Harwich Force, in order that the work of aircraft co-operating with them may be examined. Generally speaking, the guiding policy

for our Fleet was to keep the majority of ships in harbour, and to carry out continual sweeps of varying strength with the remainder. Early in the War, as already mentioned, there were no aircraft to co-operate in these sweeps, which extended far beyond the range of our aircraft working from shore bases. The direct result was that the enemy's Zeppelins, being entirely unopposed, were in a position to warn their outlying small craft; if the sweeping force was small it ran the risk of interception by a superior force suitably guided by information from the air; if the sweeping force was strong this fact was reported, and the enemy was not to be enticed out. In any case the sweeps were far less effective and much more risky than if aircraft had been available.

The only offensive operations made by the enemy's ships were three similar sweeps, during which towns on our east coast were bombarded. On only one of these occasions were we able to intercept the raiders by our surface ships and submarines. Had there existed on our side a more extensive system of air patrols, airships at long range, and seaplanes and aeroplanes closer inshore it seems that our Fleet would certainly have had a much better chance.

It was in January, 1915, that our battle cruisers intercepted the enemy's, who were probably embarking on one of these sweeps. The running fight of the Dogger Bank took place, in which two enemy battle cruisers were sunk and one seriously damaged before they could escape behind their minefields. This gives an excellent example of an opportunity for torpedo-carrying aircraft, had they been available. One hit on each ship with even a 14-inch torpedo would probably have so reduced the squadron's speed that all would have been overtaken and sunk.

In May, 1916, the Battle of Jutland took place. As is well known, before a superiority could be brought to bear, the German Fleet turned away under cover of a smoke screen and a failing light, and escaped a decisive defeat. On neither side were aircraft available in any numbers, yet the action is of interest by reason of the work which the few aircraft did, and more especially by reason of the proof it provides of the imperative necessity for air work in a fleet action.

The seaplanes in H.M.S. "Engadine" were the only aircraft available for the British. One of these sent by wireless an accurate report of part of the German Fleet before the action commenced—information which light cruisers could only have obtained after considerable fighting. The author believes, but does not know definitely, that during the battle the German airships patrolled to the southward of the High Sea Fleet, watching its line of retreat. On the morning following the battle they did valuable work in reporting our Fleet's position.

Two points are made strikingly evident by the official despatches and Lord Jellicoe's book, "The Grand Fleet." The first point is the uncertainty in the C.-in-C.'s mind as to the position of the enemy, after receiving a few reports from the battle cruisers; in other words, insufficient reconnaissance. The second point is that until about twenty minutes after the enemy had turned away, the C.-in-C. was unaware that they had done so, and to this their escape seems largely due.

Again, insufficient reconnaissance. Any aircraft flying above the mist and the smoke might well have reported the turn immediately it was made.

After the Battle of Jutland the enemy abandoned any idea of an active policy for his High Sea Fleet, and concentrated on the submarine campaign. Accordingly, we greatly extended the Heligoland Bight minefields, and in connection with the mining, long reconnaissance flights from Killingholme, Yarmouth, and Felixstowe were made as often as possible by flying-boats. The chief object of these flights was to ascertain if and where the Germans were sweeping. At the end of the War the F.2A.'s were capable of patrols measuring 400 miles on the chart, but this only took the reconnaissance about half-way across the Bight, and the need for longer range aircraft became increasingly evident. This was emphasized during the last few weeks when a final sortie by the High Sea Fleet was confidently expected.

An interesting point in connection with these long reconnaissances was the difficulty of accurate navigation over the sea, and the need for developments in this direction. Obviously the more accurate the position of mine-sweepers reported, the more valuable the report.

Whenever the flying-boats were near Borkum, considerable fighting occurred with the German seaplanes. This led to development in flying the boats in strong formation, and of defensive armament and control of fire in the boats, which eventually enabled them to hold their own.

But to send a strong formation for each reconnaissance was most uneconomical, thus showing the need of a moderately manœuvrable seaplane of high performance, which, though not intended for offensive fighting, could look after itself if attacked (A). These machines would have undertaken the work near Borkum, and the flying-boats would have undertaken the longer range work, the latter of necessity avoiding areas where opposition was likely to be very heavy. Such a machine, the "Fairey," with a Rolls-Royce engine, was produced just before the Armistice. There was much controversy on this subject, one school of opinion declaring that aeroplanes could do the work. It is, however, significant that those actually employed on continuous long-distance overseas flights (frequently over minefields) were emphatic that seaplanes or flying-boats, providing, as they do, more chance of safety in case of engine failure, are essential. Where the flights were less frequent and the strain consequently less, as in the Grand Fleet, the use of aeroplanes was satisfactory.

Whilst the large flying-boats, sometimes extending their radius by the use of lighters, confined their activities to the southern part of the "prohibited area," a number of reconnaissances over the northern part, and a raid against Tondern, were made by aeroplanes from the "Furious." The aeroplanes in light cruisers also, from time to time, had chances of attacking Zeppelins. In these operations it became evident that although the large airship falls an easy prey to an aeroplane that brings it to action, yet the action is often most difficult to bring about, because the airship can generally make a reconnaissance

without coming very close, and if pursued can often escape in clouds of fog. Critics of the airship are much too prone to make capital out of the number of German airships destroyed over the North Sea (actually only six!), whilst forgetting the countless occasions on which they did valuable work without molestation.

The reconnaissances made latterly by machines from the "Furious" had an excellent effect on the morale of the Fleet's flying personnel, and in the Tondern raid gave a fine return in material damage done, but unfortunately the extent to which the minefields had now increased, put most objectives out of range. It is interesting to examine the good results which would probably have followed if more aeroplane carriers had been sanctioned along with the "Argus" in 1916, whereas actually it was nearly a year later that "Furious," "Vindictive," etc., were sanctioned, and at a time when there was very little more data than in 1916 regarding the capabilities of aeroplane flying off and on to ships, and when the pressure on the shipyards had increased. Had more carriers been available earlier, before the great expansion of the minefields in 1917, continuous air raids on a small scale could have been made. Their object would have been to keep the enemy occupied, to collect information, and to keep up an offensive. If the development of the torpedo aeroplane, whose possibilities were proved at the Dardanelles in 1915, had received the attention it deserved, these machines would have played an important part in such raids, which might have been developed into the landing of raiding parties on the Frisian Islands, etc. Actually, however, the enemy enjoyed complete immunity from attack on his seaboard, he was thus able to decrease his defensive measures to a minimum, and concentrate on the offensive submarine campaign. Perhaps also the earlier provision of more fast carriers would have enabled the enemy's air patrol to have been neutralized. Efforts were made in this direction with the "Vindex" and "Manxman" in the Harwich Force, but their low speed and inferior carrying capacity prevented success.

The author considers that our inability to raid the German seaboard with ships and aircraft, and the fact that until the end of the War we lacked efficient aircraft with the Fleet, handicapped us and helped the enemy (whose airships provided the aerial co-operation which we lacked) to an extent not fully realized at the time. Had our Fleet not been so handicapped the War might have been considerably shortened.

CHAPTER II.

Commerce Protection and the Prevention of the Enemy's Commerce.

The Blockade.—To the stoppage of the seaboard commerce of the Central Powers, their collapse and our ultimate victory were largely due. Their stoppage was accomplished by means of the blockade, based on the right of search, which necessitated the examination of all ships

entering or leaving the North Sea by the Dover Straits or round the North of Scotland.

A minefield across the Straits of Dover compelled merchantmen to enter the Downs, where examination took place, and rendered this part of the blockade comparatively simple. But the Northern Patrol was a much more difficult proposition, involving as it did the watching of a line of some six hundred miles, from Scotland to Iceland, and thence to Greenland, where the weather was of the worst and submarines were a constant menace to the patrolling ships. In June, 1918, the laying of a mine barrage from Scotland to the Norwegian coast was commenced. Primarily this was an anti-submarine measure, but it would also have helped the Northern Patrol, by forcing merchantmen to use certain swept passages.

In conjunction with the plan for this barrage a considerable aircraft programme was contemplated, which comprised the expansion of the existing seaplane stations in the Orkneys and Shetlands, the use of airships, and the allocation of aircraft carriers and kite balloons to the patrol. Actually the programme was never undertaken, for it was realized that the long nights, the bad weather, and the great distances required to be flown rendered the work beyond the capabilities of contemporary aircraft. Had the conditions been easier there can be no doubt but that the effect of aircraft would have been great. For instance, they would have provided a most economical method of locating merchant ships and directing them to rendezvous where the searching craft would be. Again, they would have provided valuable protection for the patrol ships against submarines. In short, the great possibilities of the more efficient aircraft of the future in connection with a maritime blockade were clearly shown.

The activities of the German cruisers, such as the "Emden," and their raiders such as the "Wolf," merely emphasize the difficulty from which surface ships suffer in searching and patrolling, by reason of their limited speed and vision, as compared to aircraft. This amplifies the remarks made above concerning the use of aircraft in a maritime blockade. It is interesting to note that the "Wolf" used a seaplane, which is believed to have materially helped her.

Anti-Submarine Warfare—General Description.—The German submarine campaign, and our anti-submarine war, can conveniently be considered in five phases. In October, 1914, the first submarine attack on an allied merchant ship was made; later the enemy announced that all shipping in a prescribed zone round the United Kingdom was liable to attack, and in January, 1915, the first merchant ship was sunk without warning. Meanwhile, our policy had been one of attacking submarines wherever they were reported, in so far as the very limited means available would allow. By December, 1916, however, the situation had become so serious that a special organization was established in the Admiralty to deal with it, and with its establishment the first phase ended.

The main feature of the second phase was that increased efforts were made to harass each submarine from the moment of leaving the

base until her return. During this phase Germany declared her policy of unrestricted submarine warfare, which virtually brought the United States into the War.

The third phase commenced with the inauguration of the convoy system in the spring of 1917, previously to which the trade had been directed by "routeing" or by "suspended sailings." It was the convoy system which, above all other methods, did most to prevent the success of the German submarine campaign, and it was in connection with the convoy system, above all other anti-submarine operations, that aircraft proved of the greatest value.

In the summer of 1917 the policy of intensively mining the Heligoland Bight began to take effect, and the fourth phase may be said to have begun. Its characteristic was the great extension of mining in the North Sea and Dover Straits. The final phase was inaugurated by the enemy abandoning his attack on merchant ships, recalling his submarines, mine-laying off our Northern Fleet bases, and apparently making all preparations for a large naval engagement.

The five phases referred to apply mainly to the waters round the United Kingdom. In the Mediterranean we followed the same methods, so far as resources allowed. The work of aircraft during these phases will now be examined.

First Phase: October, 1914, *to December,* 1916.—During this period air stations grew up near every naval base at home and in the Mediterranean. Also a Wing was sent to Flanders during the first weeks of the War, which later became based on Dunkirk. It is doubtful if aircraft contributed much towards such anti-submarine measures as were taken during this period, but experience was gained which helped greatly towards the aircraft being usefully employed when the inception of the anti-submarine division of the Admiralty led to the more vigorous measures of the later phases.

By the end of 1916 the force at Dunkirk had grown to a strength of about four Wings, composed of fighters, bombers, reconnaissance and photographic machines, and seaplanes. These were used continuously over Zeebrügge and Ostend, and it was proved conclusively that seaplanes are so handicapped by the weight and head resistance of their floats, that they cannot be used where the opposition from anti-aircraft guns and hostile aircraft is very strong.

Second Phase: December, 1916, *to March,* 1917.—Immediately on the inception of the Anti-Submarine Division there followed a great increase in all anti-submarine measures, and co-ordination of the methods of their employment.

At Dunkirk the R.N.A.S. was continually augmented, until at the time of transfer to the R.A.F. it consisted of a Brigade. Up to the closing months of the War constant reconnaissance and bombing of the Flanders naval bases was done. This reconnaissance, which provided accurate data of the extent to which submarines used the Flanders ports, was of great value.

As regards the bombing in April, 1918, 17·5 tons of bombs were dropped, while in August this had been increased to 98·8 tons. From the

evidence available it seems that the material damage done was slight, probably one submarine was destroyed in Zeebrügge Docks, and in July, 1918, the lock gates at that place were probably burst. On the other hand, the enemy was forced to construct the most elaborate protection for the submarines, the constant alarms of raids must have retarded the refitting of the boats, and the effect on the crews necessitated their being sent into Germany for their leave. In addition to this, the enemy's very elaborate anti-aircraft organization must have absorbed great numbers of men and many aeroplanes, searchlights, etc., on purely defensive work.

The distinguished air officer who is best qualified to judge has estimated the relative value of the moral damage to the material damage done by the Independent Bombing Force as twenty to one. It is probable that the effects of the Dunkirk bombers and the bombing of Cattaro were similar. Certain it is, however, that aircraft provided the only means of attacking submarines in their bases.

All this bombing was done by aeroplanes, and therefore falls outside the strict scope of this paper. Mention has been made of it, however, because it shows where the legitimate work of seaplanes ends and that of aeroplanes begins.

Third Phase: March, 1917, to Midsummer, 1917.—The feature of this phase was the substitution of the "convoy" system for the previous system of "routeing." In the latter, merchant ships had been instructed, as far as possible, to keep clear of dangerous areas. Also trade was ordered to pass through one of the four "cones of dispersion," of which the apexes were Falmouth, Innistrahull, and Kirkwall. It was thought that the submarines would operate in these areas where the trade converged, and that it would be possible to patrol them adequately with every means available, including aircraft. However, this proved to be bad policy, for the increasing range of the submarines so magnified the cones that the patrolling craft were insufficient. This led to the introduction of convoys, by which system merchantmen were collected at certain ports, and then escorted to their destination. It will readily be seen that the new system presented great advantages over the old, especially for aircraft. Patrolling a large "cone of dispersion" for a periscope was indeed searching for a needle in a haystack, but convoying ensured that the flying was done where the submarine was most likely to be, and most likely to take risks.

To co-operate in the convoy system, air-stations were built up first of all in the Channel and on the East Coast, and later were extended to the Mediterranean, Irish Channel and French Coast. The U.S.A. took over the convoy work in Ireland, and the Canadians made stations in Newfoundland and at the mouth of the Gulf of St. Lawrence.

The general organization was as follows: An Air Group was formed for each operational area. The headquarters of the Group was in immediate touch with the S.N.O. and the local Base Intelligence Office, and also in telephonic and wireless connection with the air stations or sub-stations of the Group. This provided the rapid means of communication which experience had shown as essential. As regards the equipment of such a Group, this came to comprise airships,

flying-boats, seaplanes, aeroplanes, and kite balloons. The functions of each of these in convoy work will now be examined.

Airships for Convoy Work.—The S.S. Airship, virtually a B.E. aeroplane stripped of its wings and suspended under a small envelope, was the first type to be used. Early in 1918 it was superseded by S.S.Z., which had greater speed, duration, bomb-carrying capacity, and facilities for observation.

The S.S.Z. was in turn being superseded by the twin S.S. This type, whilst giving an all-round increase in efficiency, had the great advantage of twin engines, and consequent greater safety in the case of engine failure or adverse winds. Further, to meet the demand for increased performance, larger non-rigids of the coastal and North Sea classes were produced but never in great numbers.

Except for the R.29, which helped in sinking the U.115, no rigids were completed in time to play much part in the anti-submarine war, but had the War gone on they would probably have done important work in escorting convoys far into the Atlantic, for which purpose large airship sheds were in course of erection in Ireland. As the submarines were gradually driven to work farther and farther from the coast, the problem of how to provide an escort when the convoy was out of range of the smaller types of surface craft and aircraft began to arise. The difficulties of flying aeroplanes from and back to a ship are so great that at present there is little chance of each convoy carrying its own aerial escort (except kite balloons), and for the future it seems that convoy work at a great distance from the coast will be the rigid airship's rôle.

The airship's greatest difficulty was that of providing adequate sheds. Finally, mooring out sites were selected for the smaller non-rigids, and this proved most satisfactory, the ships riding out gales of over 60 m.p.h. without damage.

Much criticism was levelled at the policy of employing airships. The great expenditure on the sheds was one argument, but this was largely met by mooring out. Another argument was based on the airships' inability to fly in strong winds, and although this was true in fact it was counteracted by the facility with which they flew by night or in foggy weather.

When escorting a convoy and a submarine is sighted, the airship on account of its low speed usually fails to get over the submarine with bombs before the enemy dives. Hence it is clear that the principal value of the airship is that it locates the submarine and frightens it into diving, whereupon the submarine's speed is so reduced that probably it cannot get into position to attack.

The great variation of speed facilities for observation, signalling, and accurate bombing make airships excellent for convoy work, though on account of their vulnerability this must be confined to areas which hostile aircraft do not frequent.

Very careful statistics were kept at the Admiralty of man power, etc., used up by the various anti-submarine arms in relation to the results achieved. By these the employment of airships was fully

justified. In the author's opinion the only criticism that can justly be levelled is against the pre-war policy which so neglected airships.

Large Flying-Boats for Convoy Work.—The large flying-boats very early proved their value, for they had the essential qualities lacking in smaller seaplanes, viz., excellent view, good bomb-carrying capacity, big radius of action, and reliable engines.

Compared to airships the boats could fly in much stronger winds provided they had calm water for the take off. With the convoy station-keeping was more difficult, but the high speed gave a better chance of bombing a submarine before it dived. They were also capable of escort work where hostile aircraft were met; for instance, the Dutch traffic from Felixstowe.

As regards disadvantages, the F.2A. suffered from extreme heaviness on controls, which was, however, largely rectified in later types. The chief disadvantage was the great requirements in sheds and slipways; but as in the case of airships this was met by the expedient of mooring out. Although this was satisfactory in moderate weather, the machines were always exposed to the risk of a gale when they would almost certainly "fly" at their moorings and stave in the hulls. To render the large flying-boats really reliable when they are away from main bases where extensive slipways and sheds exist, some means of enabling them to ride-out gales in a sheltered anchorage must be found. Possibly an adjustable trailing edge by which the planes could be set to give no lift would meet the case. The author considers that this question of mooring is of great importance, and demands immediate attention (D). Some improvement was effected by keeping machines moored on lighters, but this did not entirely meet the case in really heavy weather.

Seaplanes, Aeroplanes, and Kite Balloons for Convoy Work.—Several types of seaplanes, the Short, the Wright, the Sopwith Baby, etc., were used, and all suffered from the bad view ahead, inevitable in a single-engined tractor, and insufficient bomb capacity. These disabilities, together with the fact that the seaplanes were often prevented from rising by a choppy sea, and also the necessity for reducing the number of types in production, led to the gradual elimination of the seaplane, whose inshore work was taken over by aeroplanes.

In turn these aeroplanes suffered from the same disadvantages as the seaplanes, except in the case of the Blackburn "Kangaroos," and in addition flying over the water, even with air-bags, imposed an extra strain on the personnel, and caused extra casualties.

This leads one to the logical conclusion that the type of heavier-than-air machine required for inshore anti-submarine work, say, up to about 30 miles to seaward, is a medium-sized amphibian with floats and detachable wheels, carrying at least one 500 lb. bomb and either a pusher or twin tractor (C). Normally the machine would work from an aerodrome, but, if necessary, the wheels could be dropped, and she could alight on the sea and be capable of taxying or rising again.

Kite balloons were extensively used with convoys, for they provided the only possible aerial escort when out of flying range of the

shore stations. As in the Grand Fleet there was much difference of opinion over their value, and finally the majority held the opinion that they did more harm in giving away the position of the convoy than they did good as look-outs or as "scarecrows."

Fourth Phase: Midsummer, 1917, to Autumn, 1918.—The feature of this phase was the great extension of mining and barrage work in the North Sea, the Dover Patrol, and the Straits of Otranto—the work of aircraft in this connection in the North Sea has already been described.

At Dunkirk seaplanes were originally employed for this. Their value lay in their ability to observe any change in the positions of buoys or surface nets, to act as "scarecrows" and force the submarines to dive into minefields, and to help hunting flotillas. Later the use of seaplanes had to be abandoned because they were no match for the German fighter aeroplanes, and the overseas anti-submarine work was taken over by a squadron of D.H.4's with Rolls-Royce engines.

At the Otranto barrage most of the flying consisted of hunting in co-operation with the surface craft. Kite-balloons unquestionably proved their value, for, used at the extremities of the barrage area, they forced the submarine to dive before entering the area. Generally speaking, experience on this barrage led to the same conclusions as at home.

Seaplanes were found preferable on account of the reduced risk from engine trouble, but a certain number of aeroplanes were essential for weather when seaplanes could not get off, and to provide machine to get away quickly in response to urgent calls. That aircraft are a necessary part of a mobile barrage is proved. However, it was also proved that a mobile barrage is an extravagant method of using aerial and other resources, for after the Armistice it was found that the Otranto barrage had accounted for only one submarine.

Last Phase: Autumn, 1918—General Considerations.—Of this period little need be said. The enemy abandoned the attack on merchant ships, and concentrated on submarine mine-laying off our Scottish Fleet bases. To meet this all available aircraft were moved to the East Coast of Scotland and England, and employed with hunting flotillas and on patrols.

Throughout all the anti-submarine operations there was a constant demand for increased size of bombs, more accurate bombing, and better fusing. The fusing question was the most difficult, and remained unsolved at the time of the Armistice. What was required was a variable fuse, which the observer could adjust to whatever depth he required.

Intercommunication between aircraft and ships was another vitally important question. Visual signalling by Aldis lamps was proved the best, wireless only being used for long ranges. Especially abroad, however, many patrol craft carried only indifferent signallers, and in these cases dropped messages in watertight containers proved a good expedient.

Frequently aircraft failed in their attacks because a submarine heard their approach without seeing them and dived. Experiments were made to try and find a means of silencing both engine and propeller, but they met with little success, and it is hoped that the research will be continued on this most important question.

The destruction of a submarine by aircraft alone proved most difficult. Officially aircraft are credited with only twelve submarines, though the instances when they helped surface craft in successful hunts are numerous.

Undoubtedly the most effective rôle of aircraft in anti-submarine warfare was convoy work. This was proved by statistics in 1918, when of 7,000 convoys escorted by aircraft only six were attacked.

CHAPTER III.

Support of Military Expeditions Overseas.

Dunkirk, Dardanelles, etc.—A considerable proportion of the anti-submarine work already described was in support of our numerous military expeditionary forces. However, in addition to this, certain other air work falls within the scope of this chapter, of which some of the flying on the Dover Patrol and that at the Dardanelles form the most important part.

The principal duty of aircraft, in this connection, on the Dover Patrol was to keep so close a watch on Zeebrügge, Ostend, and the eastern approaches to the Straits as to prevent the enemy's naval craft bringing off a raid in force against the cross-Channel communications of the Army in France. During the passage of the Expeditionary Force a seaplane patrol was maintained from Westgate to Ostend, and a mixed force of aeroplanes and seaplanes was sent to Belgium.

After the German occupation, however, the aircraft for the Dover Patrol were based on Dunkirk and Dover. It has already been stated that the great opposition necessitated the anti-submarine patrols and bombing being done by a squadron of D.H.4's with R.R. engines. Exactly the same conclusion was reached in the work of spotting for monitors, and reconnoitring (chiefly by photography) the enemy bases.

At the Dardanelles conditions were different. Enemy opposition was much less, calm water was nearly always available for the get-off, and hence throughout the operations seaplanes played an important part.

When the operations began in February, 1915, the only aircraft available on either side were seaplanes on H.M.S. "Ark Royal," which were employed chiefly in locating the forts and entrenchments on the Peninsula. Later, both sides were reinforced by aeroplanes, and in May H.M.S. "Ben-my-Chree," a small seaplane-carrier of high speed, arrived.

From this time onwards the presence of submarines necessitated "Ark Royal" (a ship of only eight knots) remaining in harbour. Her machines were chiefly employed in spotting for the monitors and

blister ships against positions on the Peninsula. This work they did most satisfactorily, their performance being quite sufficient against the limited numbers of enemy aircraft and anti-aircraft guns. Spotting for ships was gradually developed, and together with the experience gained at Dunkirk led to the following definite conclusions:—

(1) The best intercommunication between 'plane and firing ship is by W.T. (but the wireless telephone gives great promise for the future).

(2) The clock system gives the best results.

(3) With these aids a ship at anchor can fire sufficiently accurately to take on counter-battery work.

(4) It is, however, risky to take on targets very close to our own troops ashore.

Value of the Fast Seaplane-Carrier.—The work of "Ben-my-Chree" exemplified the great value of a fast seaplane-carrier, used as a self-contained highly-mobile unit. Wherever aircraft were suddenly required, this ship was sent. In July, 1919, her machines were spotting for the monitor "Roberts" against the Asia batteries. During the second landing in August they assisted in a dummy landing, as a diversion, near Smyrna; and later, in the same month, effectively used torpedo seaplanes in the Marmora and Dardanelles. When Bulgaria entered the war, "Ben-my-Chree's" machines reconnoitred most of the Bulgarian coast, and were used from the Island of Milo in demonstrations against Greece. Finally, when aerial reconnaissance of the approach to Egypt through Syria and Palestine (which were out of range of aeroplanes in Egypt) were urgently required in January, 1916, this ship was detached to the Egypt and East Indies stations. In each of these various operations it was found possible for seaplanes, judiciously employed, to compete with such moderate opposition as was found at first. The opposition invariably grew too strong later, but by this time the less mobile aeroplane units had had time to select their aerodromes, etc., and get to work. The simplicity of working seaplanes from a carrier, granted always the *sine qua non* of sheltered water, is very marked in comparison with the use of aeroplanes from an aeroplane-carrier, which must be both under way and head to wind.

Similar work was done by seaplanes in the operations on the coast of German East Africa, and also in the Red Sea, when in the spring of 1916 the Allied diplomatists were beginning to cast their flies over Mecca, and during the evacuation of North Russia in 1919. All of which proves not only the great value of the fast seaplane-carrier under certain circumstances, but also the value of the type of "fighter reconnaissance" seaplane already mentioned (see A, page 242).

Future "Combined Operations" by Navy, Army and Air Force.—Now an opposed landing on the enemy's territory (which may be termed a "combined operation") or the defence of our own possessions against such expeditions, has been a very frequent employment for the fighting forces of the Empire throughout history, and would seem to

be a probable task for them in the future. Moreover, it seems that the effect of aircraft on such operations will be great. Therefore, the subject may now be considered briefly in the light of war experience and of probable developments.

Let us examine the effect of aircraft on such an expedition in its various stages. The first point is that the selection of the base or advanced base will be largely governed by the range and characteristics of the defender's aircraft. Even if his aircraft were not very strong the base could hardly be as close to the actual point of landing as were Imbros and Mudros, or all secrecy would be lost.

If, however, the defender's air force was strong, and included large airships, to ensure secrecy during the preparations and embarkation of troops the base would need to be about 1,000 miles from the point of landing.

The next point is the air work during the voyage from the base to the landing. This will comprise aerial escorts against hostile aircraft, surface craft, and submarines. The relative distance between the base or advanced base and point of landing must largely decide what types of aircraft are used for these duties, and whether they work from aircraft carriers or shore bases.

The effect of the defender's air patrols might be considerable. For instance, if it was intended for the expedition to approach the coast after dark, and land by night, a machine patrolling to seaward in the previous afternoon might discover the whole expedition, and to retain any chance of surprise the attacker's air force must shoot down that machine, not merely drive it off. Probably, too, the defenders would have coastal aeroplane patrols in the evening, which would prevent the expedition approaching to very near the coast before dark, and might be a considerable handicap at a season when nights were short.

The provision of the necessary flying for covering the landing, and immediately after, presents considerable difficulties for various reasons. First, because the number of aircraft carriers would probably be limited, and there might be difficulties against keeping them under way or even anchored head to wind. Again, landing grounds ashore might be bad or even non-existent. These considerations might necessitate the use of seaplanes, providing another example of the value of seaplanes and their carrying-ship under certain circumstances. Further difficulties are imposed by the great variety of work required, such as spotting for naval or military guns, fighting, contact work, and naval or military reconnaissance.

The great vulnerability of the beaches to low-flying aircraft, and of the large numbers of anchored transports to attack by torpedo aeroplanes, must not be overlooked.

Generally speaking, the introduction of aircraft into "combined operations" appears to favour the defender more than the attacker, as the latter's machines will probably have to work from ships, or extemporized bases, and whilst suffering from the inevitable disadvantages which such conditions impose, will have to carry out complicated, varied and difficult flying.

CHAPTER IV.

The Possible Future of the Various Types of Aircraft.

A forecast of the future of the various types of aircraft can only be attempted after duly weighing the various governing factors of the problem. There appear to be three factors: First, the limitations of the various types; second, the probable requirements in another war against a first-class naval power; and finally, the teachings of the late War, many of which have already been dealt with in previous chapters. On the above lines the problem will now be considered.

Limitations of Machines Heavier-than-Air and Lighter-than-Air.—The way in which machines are likely to develop in the future appears to be determined by certain mechanical facts. If heavier-than-air be considered first, the farthest that an aeroplane or seaplane can fly in still air, taking a reasonable load of bombs, guns, etc., is, to-day, about 400 miles. Now this is not improved by increasing the size of the aeroplane, because in practice the bigger the aeroplane the greater is the structural weight compared to the useful load carried; and also because the spreading of weights over the structure, which seems necessary with increase of size, causes heavy stresses when alighting. Hence, in the future aeroplanes and seaplanes appear to be limited to flights of about 400 to 800 miles, and the average speed at which they fly is at present about 110 m.p.h. (Attention is drawn to the fact that, as explained in the Introduction, "the future," unless specially stated, refers to the next ten years.)

Improvements in the motor, in constructional methods, in propellers, will doubtless cause greater efficiency, but as these are likely to be gradual improvements and not fundamental changes, the limit suggested above seems reasonable.

With the airships the conditions are different. If the ship is increased in all its dimensions in the same proportion, the volume increases as the cube, and the surface as the square, therefore to drive it at the same speed requires relatively less power. This advantage is not all lost through the fact that the stresses on each circular sector increase with the diameter. Generally speaking, then, the bigger the airship the more efficient it is, and the limits which are met first are the size of the shed, or the difficulty of mooring out a really large ship. Notwithstanding these limits, the present-day airship is capable of carrying a reasonable fighting load a distance of about 1,500 miles in still air at a speed of about 60 m.p.h. In the future then, the use of the airship is for flights beyond the limits of heavier-than-air machines, accomplished at a more moderate speed and with a bigger load.

The extreme vulnerability of the airship to attack by a high performance aeroplane is another limit. At present it precludes the use of airships from localities where enemy fighters are strong, and the writer considers that probably this will remain the case in the future. The question of defensively arming the big airships demands very careful investigation, also the question of airships fighting each other.

Probable Requirements in a Future War against a First-Class Naval Power.—Having defined the fundamental limits of the two main classes of aircraft it is appropriate next to consider whether the requirements of a future war against a first-class naval Power are likely to differ from the late War.

A little reflection leads to the conclusion that we are most unlikely to find ourselves placed in so favourable a strategic position as in the late War, with the British Isles situated across the arteries of the sea communications of our enemy.

Again, in the late War the main bases of the opposing Fleets were separated only by some 500 or 600 miles. Is this likely to occur again? On the contrary, it is far more probable that this distance will be greatly extended, and the key of the naval situation instead of being the control of the North Sea may be the control of a great ocean. Or it is possible that the enemy's fleet may be so distant that before naval operations on a large scale can begin, our Fleet will have to move to bases situated nearer the enemy, whilst our trade and possessions within striking distance of the enemy's fleet are protected as much as possible in the meantime by local resources.

Another consideration is that the increasing use of aircraft in naval warfare will have the effect of forcing fleets to move at night or under water if they are to be unobserved, in the same manner as troop movements are nowadays made in darkness, or with great attention paid to concealment and camouflage.

What, then, are the inferences to be drawn from the difference between the probable requirements of the future and those of the late War? Obviously we cannot be content with ranges and performances which would have suited the North Sea. There must be no slackening of effort to produce aircraft with greater radius of action, greater speed, and greater all-round efficiency. Night flying and anti-submarine work must continue to be developed. Also the possibility of the Admiralty calling upon the Independent Air Force to endeavour to secure aerial supremacy over a specified part of the ocean during any big fleet movement should be recognized. The possibility referred to above of distant possessions and maritime trade being protected by local resources pending the arrival of our Fleet (which would probably take several months) opens up great possibilities for aircraft. Aircraft would be invaluable as part of these local resources—their use in defence against invasion has been emphasized in Chapter III.

The rapidity with which aeroplanes can get to Australia forms a striking contrast to the time it would take our Fleet to reach the Pacific should its presence there be necessary. When once the Empire's air routes are developed, a powerful air force from some central position, such as Egypt, could be sent to any threatened possession long before the Fleet could arrive.

If imagination is allowed to take us somewhat beyond the ten years by which the writer defines "the future" for the purpose of this paper, it is not difficult to visualize the Air Force undertaking some of the present functions of the Fleet, transporting expeditions to enemy

countries by air, arriving rapidly to reinforce beleaguered garrisons, or fighting a campaign against merchant shipping with large numbers of torpedo-carrying aircraft. Indeed, the imagination leads us into a veritable Abdullah's Cave of strategical possibilities. We are led, perhaps, out of the scope of this paper—co-operation with the Navy—into the sphere of independent air strategy. But in an age when the rapidity of communications and transportation continues to increase, a contemporary speeding up of warfare is inevitable, and such possibilities for the more distant future must be recognized. By recognizing them we can ensure that aerial development in the immediate future, and the development of imperial strategy, progress along lines which will eventually enable air power to be a safeguard to the Empire.

To return, however, to the question under consideration. Another point which should be borne in mind before trying to predict the future uses of aircraft, is that in the late War machines designed for work with the Army were produced in much greater numbers than those for the Navy. Therefore, it was often good policy to adapt a primarily military machine to naval use, because only by reducing the number of types could sufficient production be maintained. But in the next War the opposite might be the case, and therefore in peace time the provision of makeshift machines for naval purposes should be avoided.

Subject to the various considerations enumerated in this Chapter, some prediction of the future of the various types of aircraft for sea reconnaissance and co-operation with the Navy will now be attempted, and aircraft from ships at sea will be dealt with first.

Aircraft in Fighting Ships.—In a modern Fleet the writer considers there should be special aircraft-carriers and also aircraft in certain fighting ships.

Each light cruiser should carry a machine, either a single-seater fighter or a two-seater reconnaissance machine, so allotted that there was one of each type in each pair of light cruisers. The rôle of the fighters would, of course, be keeping down all enemy machines. The reconnaissance machine was not part of our Grand Fleet programme during the War, but as so much of a light cruiser's work is reconnaissance there can be little question that they would be most valuable, and it should be possible in the future to produce a suitable two-seater for this work. Wireless telephony will probably prove a most useful means of communicating with reconnaissance machines, and also with spotters.

As regards the battleships and battle cruisers. Each, it is thought, should carry at least one two-seater for spotting and at least one fighter. This would ensure that each squadron of ships had its own quota of spotting planes and fighters to protect them. Also it would avoid the complications and the anxiety to the flag officer commanding the squadron which there would be, if machines from a special aircraft carrier accompanying the squadron carried out these duties. In future it may be possible to produce a three-seater for spotting; if so, it would be a great advantage to have a gunner in addition to the pilot and observer. The author considers that spotting, and reporting enemy

movements in a naval action is too difficult for the pilot alone to do, and this necessitates the passenger (if only one is carried) being primarily an observer.

Aircraft in Carriers.—Now as regards the aircraft carriers. It is impossible to lay down any definite proportion of these to the other classes of ships, since this must depend on the composition of the adversary's fleet and the nature of the battle it is expected to fight. But it is possible to predict the types of machines to be used from the carriers. These ships should work directly under the Commander-in-Chief (except, perhaps, one or two under the flag officer commanding the most advanced light cruisers or battle cruisers), and should be stationed within visual signalling distance of him, if possible. They should carry fighters to enable aerial supremacy to be obtained at any given time and over any particular area should the Commander-in-Chief wish it; also torpedo machines, bombers and reconnaissance machines, all working directly under the C.-in-C. It is quite clear that this will necessitate there being a considerable number of aircraft carriers in a modern fleet, and that the number of carriers should be greater in proportion to the surface craft than was the case in the Grand Fleet in the late War.

Another use for the fighters will be low-flying attacks on ships, particularly destroyers whose personnel is so exposed. A determined low-flying attack on a flotilla by a squadron of fighters might easily prevent a destroyer attack being pressed home.

The carriers generally should be large ships, but a certain number of small ones (probably without landing-on decks) will be necessary for operations with light forces, like the Harwich Force in the War. Apart from the value of carriers in a fleet action, they will be useful for minor offensive operations against objectives which are beyond the reach of aircraft from shore bases.

Then there is the question of whether the machines carried in fighting ships and in carriers should be aeroplanes, or seaplanes with wheels for flying-off and capable of being dropped. The author considers that if seaplanes can be produced to fulfil the necessary flying-off conditions from the fighting ships, and in addition the necessary alighting conditions in the carriers, and also have the required performance in the air, they should be used. Obviously the fighters must be aeroplanes, but in the future the spotting machines and perhaps those for reconnaissance might be seaplanes. With the seaplanes the strain on the personnel and the wastage would be much reduced. Also, wherever the Fleet went in peace time the machines could make daily practice flights, weather permitting, irrespective of whether there was an aerodrome near by or not, and of whether the Fleet was at sea or in harbour. There will also be special uses for seaplanes from seaplane-carriers, in combined operations and minor operations, as explained in Chapter III.

Aircraft from Shore Bases.—From shore bases the future of the airship is to work beyond the range of heavier-than-air machines, or in localities where hostile fighters are weak or neutralized. Fleet

reconnaissance, patrols, anti-submarine work, bombing and reconnaissance of enemy ports, and perhaps mine-laying will all be part of the airship's duties under these conditions.

The same duties will be carried out at shorter ranges by heavier-than-air machines. Here, again, the question of seaplane or aeroplane arises, and the answer, the writer considers, is the same, viz., where the performance which is required permits, use a large flying-boat if a big machine is wanted, or a seaplane (fitted with wheels and flown off an aerodrome if sheltered water is not available) if a smaller machine is wanted. The writer considers that small flying-boats have no future, as experience has proved that they are so easily swamped.

But if the employment necessitates a very high performance an aeroplane must be used; for instance, the amphibian suggested (see C, page 248) would be suitable for anti-submarine work if there was little opposition, although for similar work or reconnaissance on a strongly-defended hostile coast, everything else should be sacrificed to performance, and an aeroplane used.

In addition to the duties enumerated, heavier-than-air machines would be most valuable for attacks against an attempted landing, as already explained. In such operations, and for attacks on ships in harbour the torpedo machine has a great future. These machines should be developed on two lines, the small handy machines (particularly suitable for work from ships) to attack at close range, and large machines for attack at longer ranges, requiring less manœuvrability. For the latter work the flying-boat is believed to have already been found suitable. With the advent of the improved mooring-out capabilities suggested (see D, page 248), it is easy to visualize a squadron of torpedo-carrying flying-boats working like a destroyer flotilla of to-day.

In all aspects of overseas flying the difficulty and importance of accurate navigation is very great. Too much attention cannot be given to this question. At present directional wireless seems the most promising method.

Conclusion.—Finally, it is only necessary to add that whereas in the late War aircraft gradually became valuable in nearly every branch of naval warfare, study leads to the conclusion that in the next war against a first-class naval Power the use of aircraft will be very greatly extended. Consequently, to a naval Power which now develops aerial co-operation with the fleet, largely and on sound lines, aircraft are a vast accession of strength. But to a nation which fails to do this they are a most serious danger.

GENERAL MACK.

By Major A. F. Becke, late R.F.A.

MANY officers have read the Campaign of Ulm; but probably very few have formed a really correct impression of the Austrian General whose surrender at Ulm, on 20th October, 1805, completed one of the great triumphs of Napoleon's career.

There is in existence a contemporary picture, by Berton, which depicts General Mack advancing on foot, hat in hand, to make his formal surrender to the Emperor of Battles. In this drawing the defeated General appears to be an active, well-set-up, strongly-built man, with white or powdered hair, or possibly wearing a white wig. So far as General Mack is concerned the picture is extremely misleading; and the one of him in Sloane's "Life of Napoleon" is even more so.

In England, indeed, portraits of Mack are so rare that the one accompanying this article is well worth rescuing from oblivion. For not only does it give an accurate portrait, but it illustrates admirably the curiously varied aspects of his personality. It is to be found in an English book, which includes also a description of General Mack by a British officer who actually met him. But the book itself is little known and a very rare publication. Its title is "The Memoirs of the late Major-General Le Marchant," by Sir Denis Le Marchant.[1] It

[1] Major-General John Gaspard Le Marchant was born in 1766. At the age of eighteen he was appointed to an Ensigncy in the Royals, and in 1783 he joined his regiment in Dublin. After a few years he purchased a Cornetcy in the Inniskilling Dragoons, then he obtained a vacant Lieutenancy in the Bays; whilst three years later he purchased his troop in the same regiment. Then in 1793 Captain Le Marchant received orders to join the Allied Army on the Continent, and at the end of May he disembarked with his squadron at Ostend. He was first engaged at Cassel on 30th June and distinguished himself in that fight. By August he was appointed Brigade Major of the Cavalry Brigade, which included the Blues, the 2nd Dragoon Guards, and the Inniskilling Dragoons; and on 15th April, 1794, he met General Mack. Captain Le Marchant's further promotions were: In 1794 a Majority (by purchase) in the 16th Light Dragoons; in 1797 a Lieutenant-Colonelcy in the 7th Light Dragoons, to which latter regiment he was appointed by the King. He became instructor at the Military College at High Wycombe when it was formed on 4th May, 1799; and in 1802 was appointed first Lieutenant-Governor of the Royal Military College, at Sandhurst, which was originally the junior department of the High Wycombe institution. During the summer of 1811 he was raised to the rank of Major-General in the ordinary course of promotion; and on 3rd July, 1811, he was given the command of a brigade of cavalry for service in Portugal. Major-General Le Marchant saw considerable service in the Peninsular War in the year he was there, and doubtless would have achieved distinction had he survived; but he was killed (at the age of forty-seven) charging at the head of the Heavy Cavalry Brigade (5th Dragoon Guards, 3rd Dragoons, and 4th Dragoons) at the Battle of Salamanca, 22nd July, 1812. Sir Denis Le Marchant, the first baronet, was the son of Major-General Le Marchant.

was printed privately and published in London, in 1841, only ninety copies being issued; this accounts for its being so little known and so rarely met with. (The writer only knows of two copies, one of which is in the British Museum Library.) As none of the well-known English and French works on the campaign quote this book,[1] or give any really authentic and realistic description or portrait of General Mack, it is thought that a reproduction of the portrait and a very short summary of General Mack's career might be of interest to students of the Napoleonic campaigns.

General (then Captain) Le Marchant was serving with our Army in Cambrésis, in 1794, when he met General Mack, who, at that time, was Chief of the Staff to Prince Josias of Saxe-Coburg, the Commander-in-Chief of the Allied Army, which was operating in Northern France, on ground that was, in our time, to become historic as the scene of the British Army's operations in 1914 and in 1918.[2]

The description given by Captain Le Marchant of General Mack runs as follows:—

> "Mack is a man of forty,[3] extremely like the Abbé MacCarty; he has some complaint in the head that keeps him in constant pain. In consequence, he wears a black caul over his skull, sewed round the bottom with thick black hair, which gives him a very grotesque appearance. He lies all day on his bed, writing with a pencil his instructions for the movements of the Army; when an action takes place he is lifted from his bed to his horse. It is singular that, with these habits, he is a passionate admirer of the sex. He is accompanied everywhere by a female attendant. I have made a sketch of his face, which is thought to be very like him."[4]

The sketch certainly portrays the salient features given in Captain Le Marchant's vivid description of the Austrian General, whose niche in the temple of fame is secured by the fact that his career for one unlucky moment touched that of the great Emperor whose legions shook the kingdoms of Europe; and at the very time, too, when the Emperor gained one of the greatest triumphs of his life. Thus Mack's name will never die, and his personality deserves to be accurately portrayed for the student.

Karl Mack was born on 25th August, 1752, at Nennslingen, Franconia (in Bavaria). On 16th January, 1770, the boy enlisted in the Archduke Francis' Regiment, the 2nd Regiment, of Carabiniers, in which one of his uncles (Rittmeister von Leiberich) was commanding a squadron. His rise was thus assured, and it was steady. In succession he became corporal in the quartermaster's office (for he could

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[1] Even *La Campagne de 1805 en Allemagne*, by Alombert and Colin, never mentions the Le Marchant Memoirs.

[2] Mons and Le Cateau in 1914; Cambrai, the Selle, and Mons in 1918.

[3] This was written in 1794.

[4] The author of the Memoirs says in a footnote: "This sketch is in my possession, and has been pronounced by competent judges to be a very striking likeness."

both read and write, and later had some skill in drawing maps), then sergeant-major, and soon after gained his commission as second lieutenant; and four years later was promoted to first lieutenant.

He now became Secretary to Field-Marshal Count Lacy,[1] and in 1778 accompanied him during the Turkish War. It was during this short campaign that he was fortunate enough to attract the attention of the Emperor Joseph II.

When his period of active service was over, Lieutenant Mack was not forgotten by the Field-Marshal; and in 1781 he was transferred to the General Staff with the rank of Captain. He now had his foot firmly planted on the ladder of promotion and success, and his future looked very promising.

Field-Marshal Lacy, when he took charge of the operations against the Turks in 1788, remembered Captain Mack once again, and took him as his A.D.C., and obtained for him the rank of Major. When Marshal Loudon[2] assumed the Chief Command in these operations, Mack disagreed with him; but this did not lead to any really serious set-back in his career, for 1789 saw him promoted in rapid succession, first to Lieutenant-Colonel and then to Colonel, whilst in the same year he received the Order of Maria Theresa, and was ennobled as Mack von Leiberich.

In 1790 Colonel Mack again saw active service, and it was in these operations that he was severely injured in the head; an injury which, it is generally thought, affected him permanently, and probably occasioned that constant pain in his head to which Captain Le Marchant referred in his description.

In 1792 he was appointed to the Staff of Prince Josias of Saxe-Coburg, Commander-in-Chief of the Allied Army in the Netherlands,[3] and in 1794 became Chief of the Staff in this Army. It was during

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[1] Francis Maurice, Count Lacy, the Austrian Field-Marshal, was born in 1725, and died in 1801. His father was an Irish Jacobite, who, after serving France, entered the Russian Army and became a Russian Field-Marshal.

[2] Gideon Ernst Freiherr von Loudon was born at the family estate of Tootzen in 1716. He was descended from a branch of the noble Scottish family of Loudon; but his direct ancestors left Ayrshire in the fourteenth century and emigrated to Livonia, where, in course of time, the family became rather impoverished. Shortly after Loudon's birth, Livonia was ceded to Russia; consequently, he first took service in the Russian Army as a cadet in 1731. In 1742, however, he transferred to that of Austria, after having attempted unsuccessfully to obtain from Frederick the Great a commission as Captain in a cavalry regiment. Loudon rose rapidly in the Austrian Army and served in the Seven Years' War with distinction, commanding at Kunersdorf, where he had the satisfaction of winning a great victory over Frederick. On one occasion, when talking over the events of the Seven Years' War, the great King exclaimed: "We all of us made mistakes, except my brother Henry and Loudon." In 1775 Loudon was offered the rank of Marshal in the French Army if he would exchange from the Austrian service; but he refused this high honour. In 1778 Loudon became a Field-Marshal in the Austrian Army. He died in Moravia on 14th July, 1790, on the first anniversary of the storming of the Bastille. At the time of his death Loudon was probably the first General in Europe.

[3] Included in this Army at this time were more than 7,000 British troops, nearly half of the total being cavalry. The Battle Honours of "Villers-en-Cauchies," "Beaumont," and "Willems" commemorate these operations.

these operations that he attracted the favourable notice of the young Archduke Charles of Austria.[1] In 1794 he was promoted Major-General; but soon afterwards he had to proceed on sick leave in order to recover from another wound that he had received. In 1796 he gained a further step in rank, being now promoted to Lieutenant-Field-Marshal.

But the tide of Mack's career and good fortune had reached high-water mark at last, nor was it long before the ebb began; then Fortune entirely deserted her former favourite. In 1798 fate willed that Mack (at the request of the British Government) should be sent to command the Neapolitan Army, probably the most fragile instrument ever wielded by any commander. The King of Naples (Ferdinand I.), with uncompromising and unflattering brevity and truth, described it as follows: "You may dress it in blue, or in green, or in red; but, whichever you do, it will run!"

In November, at the head of this armed rabble, 38,000 strong, Mack took the field. With it he actually occupied Rome, for the French retired as he advanced. But then Fortune deserted him entirely, for he made the mistake of pushing forward small isolated columns, and General Championnet,[2] in command of the French Revolutionary troops, at once seized the chance thus offered and advanced against Mack and drove him and his wretched army out of the Eternal City. Mack then fell back to, and occupied, a fortified position at Capua, covering Naples; but the *moral* of the Neapolitan Army was so feeble that on Championnet's advance this position had to be abandoned without fighting. The worthless Neapolitan Army had been quite true to its traditions. On 21st December, 1798, King Ferdinand I. discreetly left for Sicily; and on 10th January, 1799, Mack obtained his first unhappy and unenviable experience of signing a capitulation.

On this occasion he ceded all the Neapolitan strong places and magazines to the French, and arranged for Naples to pay them ten million francs. This so exasperated the Neapolitans that, to escape being killed by the infuriated populace, Mack fled, and sought refuge—in Championnet's camp!

Having surrendered as a prisoner, he was then sent to Paris, and it was during his period of captivity that Napoleon met him. General

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[1] The Archduke Charles was born in 1771. In 1809 he inflicted a severe defeat on Napoleon in the Battle of Essling (or Aspern) on the Danube below Vienna. This was the first defeat Napoleon ever experienced. It was in this battle that Marshal Lannes was killed. The Archduke Charles died in 1847.

[2] Jean Étienne Championnet was born at Valence in 1792. He commanded a battalion of volunteers at the outbreak of the French Revolution; later he served with the Army of the Rhine under Hoche, and was promoted General and given a division. He then joined the Army of the Sambre and Meuse, and in 1794 he fought in Jourdan's victory at Fleurus; and later took part in the operations of the Army of the Lower Rhine. In 1798 he commanded in Italy against the Neapolitan Army. He then fell from favour and was removed, but, on a change of Government taking place, he was given the command of the Army of the Alps. There, after some success at starting, he was soon overwhelmed by weight of numbers, and in December, 1799, Championnet succumbed to illness at Antibes.

Buonaparte summed up the Austrian General as follows: "Mack is one of the most mediocre men I have ever met in my life. Full of conceit and vanity, he considers himself fit to do anything. He is nothing now; but I should like to see him some day opposed to one of our good Generals: he would see fine things! He is very self-confident, and that is all. He is one of the most incapable men possible; and, in addition, he is unlucky."

It was both a striking summary and a shrewd forecast; for in October, 1805, it was Mack's ill-fortune to be opposed by Napoleon himself, and in very truth the luckless Austrian saw "fine things."

Whilst a prisoner Mack was for a time released on parole. Finally, in 1800, he managed to effect his escape in disguise and reached Vienna, but he was not employed again before 1805. Then in that fateful year his political influence, skilfully manipulated, obtained for him the command of the Army, and he was instructed to prepare for war with France. His rise was due to the party opposed to the Archduke Charles, who was entirely against a break with France. Mack, with his customary light-heartedness and his desire to believe what he wished, gave an opinion without any examination of the real facts about Austria's military situation. These facts were in the Archduke's possession, and Mack never saw them. But his readiness to agree with them pleased the war party, and Mack obtained re-employment that was to bring both Austria and himself eternal shame. The politicians who secured him this post are responsible for much of their country's humiliation at the hands of Napoleon.

On the opening of the campaign of 1805, Mack naturally became Quarter-Master General (i.e., Chief of the Staff) under the Archduke Ferdinand. On 27th August Napoleon set the Grand Army in motion from the camps at Boulogne, and within eight weeks this part of the campaign was over. Mack had surrendered at Ulm with 25,000 men, 40 Colours, and 60 guns.

There is one picture of Mack during these operations that will ever remain as a proof of his readiness to twist facts so that they might mean what he desired. On 15th October, whilst the fighting was in progress for the heights to the north-west of the Fortress, Mack dragged himself along the ramparts leaning on the arm of his valet. The Austrian Commander was dressed in a blue frock coat and he wore a night-cap under his cocked hat. The firing was heavy and near at hand. Nevertheless, he kept on assuring all who would listen to him that the assault was merely a feint and that the French Army was already in full retreat. This amazing statement was made whilst the most convincing proofs to the contrary were being given. For it was delivered to the accompaniment of crashing chimneys and cascading tiles from the roofs of the neighbouring houses, with the besieging hosts close around the walls of Ulm, and an entire army shut up within the fortress itself. Mack apparently believed, or wished to believe, that Napoleon had made a march round Ulm and was now engaged in marching back to France![1] Such a belief proves that Mack possessed

[1] Mack's general order issued on the previous evening, 14th October, began with the words: "The retreat of the enemy. . . ."

no military qualities whatever that fitted him for high command; and that his mind was of the same type as Weyrother's, the General who was so largely responsible for the Allied disaster at Austerlitz in the same year.

There is no doubt that in these famous operations, which culminated in disaster for Austria, Mack made several vital miscalculations. It is certain that he counted on the punctual arrival of Austria's allies—the Russians under Kutusof—and in this he was disappointed. Furthermore, it is clear that he under-estimated the strength of the Grand Army, its wonderful ability to live on the country through which it passed, and where his own Army was almost starving,[1] and the extraordinary marching power possessed by the Grand Army when manœuvring under the eyes of Napoleon—"the God of Modern War." In addition Mack's Army was demoralized, his Generals insubordinate, and the Archdukes quite impossible to deal with.

The great outstanding lesson of the campaign was tersely put by the Emperor, when he said that his triumph at Ulm was won "not by the bayonets but by the legs of his soldiers." A fact that was put even more concisely, during the great German advance through France in August, 1914, by a Prussian Colonel[2] to his assembled officers, when he said, "Sweat saves blood!"

On 2nd December, 1805, six weeks after Mack had capitulated, Napoleon realized that the time had come to dispute the Empire of the World and to finish the campaign by one tremendous blow. On the field of Austerlitz he then risked all in order to gain a decisive victory, and his reward was great. For the shattering blow he dealt in Moravia that day to the Austro-Russian Army ended the war of 1805 with a resounding thunderclap that reverberated across Europe. Further, it placed Napoleon on the very pinnacle of glory, for Austria, beaten to her knees, promptly accepted peace at the point of the sword.

With the signing of peace Austria began an inquiry into the causes of her failure, and naturally an attempt was made to fix the responsibility for the disaster she had suffered. Consequently, it was not long before it was decided to bring Mack before a court-martial for his share in the surrender at Ulm.[3]

The court-martial opened in 1806, and sat irregularly for seventeen months. Finally, in 1807, it found Mack "guilty," and sentenced him to be deprived of his rank, his colonelcy of a cuirassier regiment, his Order of Maria Theresa, and to suffer imprisonment for two years. He was, however, released in 1808.

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[1] In this connection the maxim of the Imperial Guard may be recalled, "The enemy is like a sheaf of corn: the more you beat him, the more he shells out!"

[2] Colonel von Reuter, commanding the 12th (Brandenburg) Grenadier Regiment, in the 5th Division of the IIIrd Corps, with Von Kluck's Army.

[3] As early as 10th November, 1805, the Archduke Charles had actually written: "Every day the outlook is more gloomy; all is lost—if the Emperor does not hang Mack, Cobenzl, and Collenbach."

In 1819, when the Napoleonic campaigns had entered the domain of past history, Field-Marshal Prince Schwarzenberg[1] interested himself on Mack's behalf, and obtained his reinstatement both in the Army and in the Order of Maria Theresa. After this Mack lived on until he reached the age of 76, and died at S. Polten, in Austria, on 22nd October, 1828.

Whilst making full allowance for the difficulties with which Mack had to contend, both in Italy in 1798 and in Swabia in 1805, yet it is hard to disagree with Napoleon's criticism of his lack of ability, his conceit, and his ill-luck—and the latter is almost the worst fault a General can possess.

A later estimation of Mack's character shows that he was very facile of speech but essentially superficial; he was inordinately self-confident and vain, but in reality he was devoid of military genius; and, worst of all, he was a political intriguer. He was a man who was prepared to risk his country's fate so long as he could obtain the employment that he wanted.[2] He was indeed all that Napoleon said of him, and more.

General Le Marchant's portrait undoubtedly does nothing to dispel this conclusion, for, as Carlyle said so truly, "The natural face of a man is often worth more than several biographies of him."

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1 Prince Schwarzenberg was born in 1771. In 1813 he was Generalissimo of the Allied Armies which won the Battles of Dresden and Leipzig. In the next year, 1814, he commanded the main army in the campaign in France, which ended on 6th April in Napoleon's first abdication. Schwarzenberg died in 1820.

2 Major-General A. Krauss in "1805, Der Feldzug von Ulm" (Vienna, 1912). From this detailed and accurate history many of the principal facts and dates have been taken.

THE DEFENCE OF VERDUN.

(From the latest French sources.)

By Major T. E. Compton.

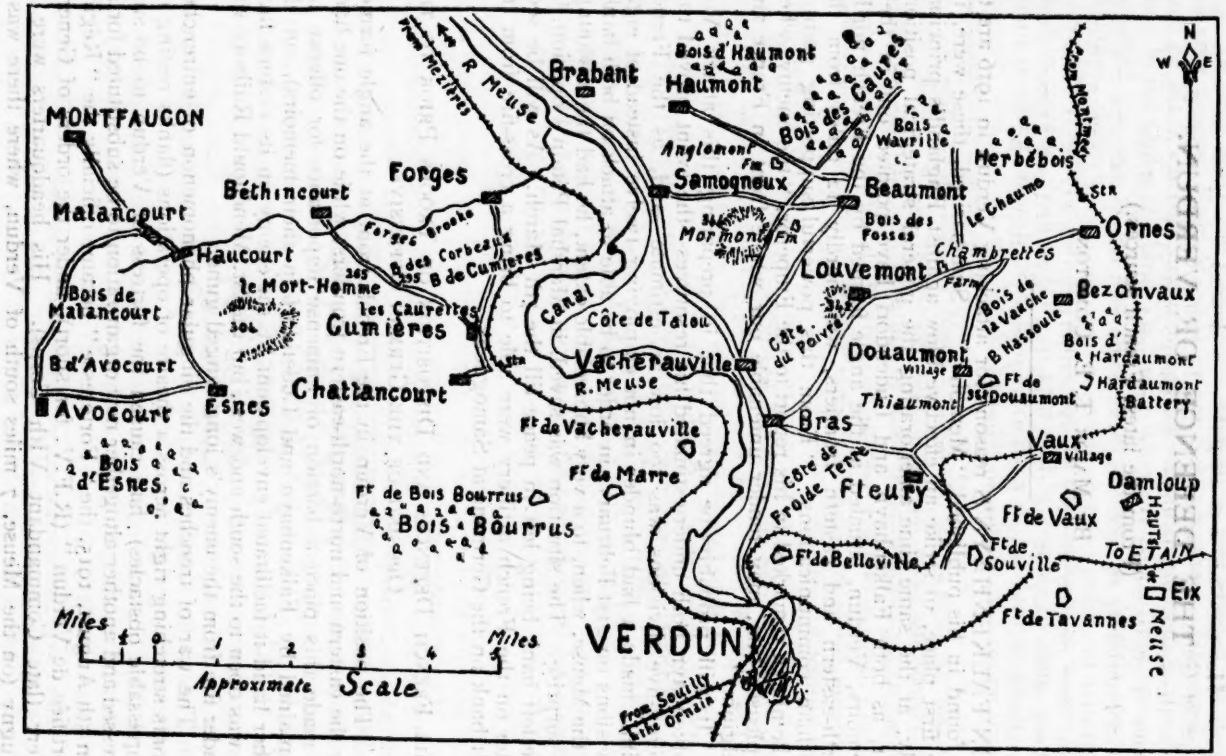
VON FALKENHAYN'S reasons for attacking Verdun in 1916 are to be found in his published "Memoirs." Summarized, these were, in the first place, to strike an effective blow against England's principal Ally, at the same time ameliorating the general strategical position. For, as both Falkenhayn and Ludendorf have pointed out in their memoirs, Verdun, situated at the angle formed by the French north-north-eastern and eastern frontiers, was hardly 12 miles from the German communications. "From this powerful supporting point," Falkenhayn remarked in his report to the Emperor, "the enemy, when it pleases him, may render untenable our whole front in France and Belgium."

It will probably be agreed that in preparing this attack Von Falkenhayn both under-estimated his resources—the event proved that twenty-five divisions was too low an estimate—and, as the French think, made a bad blunder in not employing twelve instead of eight divisions on 21st February, in order to be able to attack on both banks of the Meuse, when, to a very appreciable extent, he had the advantage of surprise. The situation was saved, in Marshal Pétain's opinion, by the left bank being left in peace till the 7th March. As will be seen later on the French artillery were able to bring a cross-fire from the left bank on the Germans at Samogneux.

The French Defences and Disposition of Troops Prior to the Opening of the German Offensive.

The position of Verdun in the French front at the angle formed by the eastern and north-north-eastern frontiers, while on the one hand it made this place a bastion of immense importance for offence (as explained by Falkenhayn and Ludendorf in their memoirs), on the other hand it facilitated envelopment by the enemy on its eastern face. It was open to the south and west, but the St. Ménéhould Railway was under fire from the enemy's long-ranged guns.

The war of trenches and the singular phenomenon of entrenched fronts stretching right across a theatre of operations (flanks resting on impassable obstacles) had caused the fortress of Verdun to be suppressed and another altogether new organization to be substituted for it. On 5th August, 1915, the "Forteresse" became officially the "Région fortifiée de Verdun" (R.F.V. for short), under the orders of General Herr (late Commandant VIth Corps). His headquarters were at Dugny (on the Meuse, 7 miles south of Verdun, where there was a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les Caurettes
Cumières
Chattancourt
B des Corbeaux
B de Cumières
Forges Brook
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Brabant
Canal
Côte de Talou
Vacherauville
R. Meuse
Ft de Vacherauville
Ft de Marre
Ft de Bois Bourrus
Bois Bourrus
Bois d'Haumont
Haumont
Bois des Caures
Bois Wavrille
Anglemont Fm
Samogneux
Beaumont
Herbébois
Bois des Fosses
Mormont Fm
Le Chaume
Ornes
Chambrettes Farm
Louvemont
Côte du Poivre
Bois de la Vache
B Hassoule
Bezonvaux
Bois d' Hardaumont
Douaumont Village
Ft de Douaumont
Hardaumont Battery
Thiaumont
Bras
Côte de Froide Terre
Fleury
Vaux Village
Damloup
Ft de Vaux
Ft de Souville
To ETAIN
Haudainville
Eix
Ft de Belleville
Ft de Tavannes
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fort).[1] His mission was twofold: to defend the front between the armies of General Humbert (on his left) and General Roques (right), and at the same time to take "all useful measures" for opposing the menace of encirclement from the Argonne and Saint-Mihiel.

In February, 1916, the R.F.V. comprised eight divisions and two Territorial brigades. Before the 21st, the date of the German attack, it had been reinforced with heavy artillery, so that General Herr (an artillery officer) had on the right bank 152 heavy and 186 75-mm. field guns (about half of which fell into the enemy's hands) and on the left bank 98 heavy and 202 75-mm. guns.

On the left bank were posted the 29th Division at Avocourt (extreme left of the region) and the 67th Division about Béthincourt and Forges, the latter resting its right on the Meuse.

On the right bank the XXXth Corps (Chrétien) of three divisions held the northern front from Brabant to Herbébois and the eastern front from Herbébois, through Ornes and Maucourt, to Fromezey (2½ miles west of Etain).

The IInd Corps (Duchesne) carried on the line in the Woëvre, but was withdrawn, soon after the fighting began, to the Hauts de Meuse.

The eastern front soon ran sharp back by Douaumont—Vaux—Damloup, and the IInd Corps then carried on the line to the south.

The positions occupied by the above troops might well have been stronger; that is to say, more strongly fortified. Want of adequate labour seems to have been the reason. When, on the 15th January, 1916, General Herr became convinced of the imminence of attack, it was too late. He reported his views by letter on the 16th through General Dubail, commanding the Right Army Group. The R.F.V. was thereupon transferred to the Centre Army Group, and General de Langle de Cary called upon to make a report. This reached the G.Q.G. on 23rd January, and General de Castelnau (Chief of the Staff) left at once for Verdun and made an inspection of the defences the same day. His decisions were as follow:—

"The first position requires completing by the construction of *abris-places-d'armes* for reserves and of certain closed reduits, Haumont Village strengthened, and the ravines west and south-east filled with barbed wire entanglement. The second position requires to be entirely modified. The principal line of resistance should be established on the reverse slopes (Wellington's defensive tactics). The front Mormont Farm—Hill 344 must be made stronger. Flanking positions generally have been wrongly sited. They should be so placed as to bring fire on obstacles and not on the flanks of posts in front, which fire should be found by organs distinct from the *organes de défense proprement dits.*"

A third line was required on the reverse slopes of Louvemont.[2] In the event, the first position held three days, the second one day, and there was no third.

[1] There were similar organizations at Dunkirk and Belfort.

[2] M. Madelin gives the date of General de Castelnau's inspection as the 23rd. M. Gillet's date is the 19th. "Verdun," by M. Madelin. (Paris, Alcan, 1920.) "La Bataille de Verdun," by M. Louis Gillet. (Paris and Brussels, Van Oest, 1921.)

The German Assault.

If the French defences could have been completed according to the decisions of General de Castelnau the Germans would, there is little doubt, have been held up on the third position, even allowing for the rain previous to the assault. But, as regards numbers, the odds were, naturally, much in favour of the attackers: six divisions (three army corps) against two.

For the assault of the northern front on the right bank of the Meuse, the enemy had concentrated the VIIth (R.), XVIIIth, and IIIrd (Brandebourg) Corps. These specially-trained troops, in the order named from the right, advanced, on 21st February, at 6.0 in the evening, against it on a front of five miles, after artillery preparation for eleven hours, the weight and intensity of which surpassed all previous experiences. On the eastern front, another specially-trained Corps, the XVth, carried on the German line in the Woëvre, but was not engaged till 8th March. It acted indeed as a first reserve to the assaulting body, several of its battalions being brought over to reinforce the other corps before the end of February.

All these four corps were additional to the Vth Army, which lay behind in reserve. Of the attacking corps, the XVIIIth and IIIrd had each of their two divisions in first line. The VIIth (Reserve) had one division only in first line, the second was in support. It is evident that the attack formation was very dense. Whatever the exact strength of battalions there must have been some ten of them to the mile in front line.

As to results on the 21st, while the extreme right and left—Herbébois and Brabant—continued to resist successfully, in the left centre of the defence the Germans made serious progress. The principal organized posts of the front line were from the left, Brabant, Côte des Roches, Haumont, Haumont Wood, Caures Wood, Wavrille, and Herbébois. Of these, Haumont Wood, lying some half mile to the north-east of the village of the same name, was considered one of the strongest and had been most completely organized. It was defended by the 165th Regiment, and appears to have been looked upon by the commander of the 72nd Division as a secure *point d'appui*. But both this wood and the Bois des Caures were salients inviting attack, and with the masses of German infantry available they were soon enveloped. The 165th[1] put up a very gallant defence for five hours, but at night the Germans were in possession of Haumont Wood, menacing thus the dislocation of the whole first position.

A counter-attack on the morning of the 22nd failed, and by the evening of this the second day Haumont Village also had fallen into the enemy's hands. It speaks volumes for the tenacity of the defence against such overwhelming odds that the village was held by the French till 6.0 p.m.

The loss of Haumont Wood affected disastrously the defenders of the Bois des Caures, where Lieut.-Colonel Driant, in command of two

[1] M. Madelin says of this regiment that when the Wood was lost "*le 165e n'existait pour ainsi dire plus.*"

battalions of *chasseurs à pied*,[1] held on gallantly till 4.0 p.m. the 22nd, when surrounded on three sides, he ordered retirement on Beaumont. It was in this retreat that Colonel Driant (son-in-law of General Boulanger, deputy and militant Catholic, who had resigned his commission rather than carry out orders in respect to taking inventories in the churches) was killed.

Brabant, on the extreme left, was evacuated during the night. Only about Herbébois the defenders of the first position still held their ground, and taking advantage of this pivot, on 23rd February, a general counter-attack enabled the French to hold the line Samogneux—Beaumont—Herbébois for the best part of the day. Herbébois was almost impregnable, owing to the wood, cut to pieces by the German artillery fire, having been formed by the French (two companies 36th Regiment and two companies 310th Regiment) into an impassable *abatis*.

Towards evening (23rd), however, the Wavrille Wood on its left and left rear was lost, which obliged the defenders of Herbébois to leave it at nightfall, most reluctantly, and the whole of the first position was thus at last in the hands of the enemy.

Samogneux, in flames, was evacuated, and in the morning of 24th February the R.F.V.'s northern front ran from Hill 344, south of Samogneux, overlooking the Meuse, through Mormont Farm—Beaumont, to the Chaume Wood (west of Ornes), with advanced posts at the Anglemont Farm and the south end of Caures Wood. But the situation on this line was desperate, owing to the lack of reinforcements.

Loss of Douaumont Fort.

At the first alarm in January, the G.Q.G. had placed the VIIth Corps (37th, 14th and 48th Divisions) in reserve, and on 13th February it was at Souilly, 10 miles to the south of Verdun, on the left bank of the Meuse. Later, the XXth Corps from Lorraine was moved into the sector. Units of these corps now began to relieve (not reinforce) the worn-out divisions of the XXXth Corps. Thus, on the left, the 37th Division took the place of the 72nd. The 14th Division, with the leading brigades of the XXth Corps, relieved the 51st Division. On the left bank the artillery of the VIIth Corps (Bazelaire) co-operated by bringing a cross-fire against the enemy attempting to advance from Samogneux.

But on this the fourth day of the battle (24th February) the want of a prepared third position, combined with the necessity of relieving, instead of reinforcing, the fighting line, rendered the northern front radically weak everywhere, except on the extreme left. The fresh troops were new to the ground, which had not been properly organized defensively, and were opposed by a victorious enemy greatly superior in numbers and reinforced. It is not surprising, therefore, that in the afternoon of this day (the 24th), after capturing the French advanced posts (Anglemont Farm and south end of Caures Wood), a general

[1] 1,800 strong, they came out of action 280.

advance of the German centre and left carried Beaumont, Fosses, Ornes, the Chaume Wood, and pushed the defence back by the evening to the line Côte de Talou—Côte du Poivre—Louvemont—Bezonvaux.

It was then that General Joffre (9.0 p.m., 24th February) detailed the Second Army (Pétain), comprising the Ist, XIIIth, and XXIst Corps, in addition to the troops already in the sector (VIIth and XXth Corps), for the operations on the Verdun front.[1] It was at this juncture that General de Castelnau saved the situation.

Furnished by Joffre with full powers as *major général* (Chief of the Staff) he reached General Herr's headquarters at Dugny in the early morning of the 25th, having previously telephoned to the General the following message:—

"As confirmation of the Commander-in-Chief's orders, General de Castelnau prescribes *de la façon la plus formelle* that the northern front of Verdun, between Douaumont and the Meuse, and the eastern front on the line of the Meuse Heights, should be held at all costs and by all the means at your disposal. The defence of the Meuse is on the right bank. There can therefore only be a question of stopping the enemy at all costs on the right bank."—(*Journal Officiel*, 26th October, 1919.)

This was the spirit that permeated the French Army, and it was well that it was expressed thus early, for the events of 25th February put it rudely to the test.

In the morning of 25th February the 37th Division was attacked simultaneously from Samogneux and from the Bois des Fosses, and although the former attack was checked by artillery fire from the left bank, by 2.0 p.m. the position about Louvemont was lost, the village being evacuated later. On the right the 153rd Division of the XXth Corps, heavily engaged in front and attacked in flank from the Bois de la Vauche, was obliged to surrender eventually the high ground east of the Haudremont Farm. In the evening this division was holding Douaumont Village and the heights east and west of it, and it was then thought advisable to enter into communication with the garrison of the Fort, situated about half a mile to the south-east of the village. To the general surprise it was found to be in the possession of the enemy. It had, in fact, not been defended.

M. Madelin explains this extraordinary and disastrous occurrence (for, besides the moral effect, its capture provided the Germans with an excellent observatory, this fort and Souville being on the highest points, about 1,280 feet above sea-level) authoritatively as follows:—

"Having myself passed the first weeks of the war in this fort, I was called upon, a few days after the event of the 25th February, by the Staff of General Pétain to suggest an explanation. It is simple enough. Since October, 1914, by order of General Coutanceau—which seems to have been only the application of a general order of the G.Q.G.—the garrison of Douaumont had evacuated the fort (as living quarters) in order to live in huts adjoining it, whence in case of attack they would be able to man it as quickly as if they lived in it.

[1] Instruction of 25th February, 9.0 a.m.

"In 1915 Douaumont Fort was in the third line of the defence, and since then it was only occupied by some gunners.

"When suddenly Herbébois, Des Fosses, De la Chaume, Ornes, and the valley of the Vauche were lost, and the retreat of the Woëvre troops made Douaumont Fort a bastion of the first line, it is clear that it ought to have been reoccupied. But at this very hour the XXXth Corps Staff was handing the defence over to the Staff of the XXth Corps (Balfourier), who could not for an instant have suspected that the fort was almost empty as regards defenders."

The German account states that on the 25th two companies of the 24th (Brandenbourg) Regiment were ordered to establish themselves 800 yards from the barbed wire entanglements in front of the fort. But when at that distance the commander saw no sign of life, he pushed nearer, and was able to cut through the wire and enter the fort without hindrance. Nineteen French soldiers were then made prisoners, and subsequently fifty more. The officer in command of the fort stated, according to this account (taken from the literary supplement of the *Times* of 21st August, 1919), that he was deceived by the snowstorm, and thought the German assailants were French.

The loss of Douaumont Fort had further serious consequences. General de Bonneval (37th Division), on hearing of this misfortune and the retirement of the 153rd and 14th Divisions to Douaumont and Meuse Heights respectively, became alarmed for the safety of his troops on the Côte de Talou and Côte du Poivre, and under the misapprehension that the evacuation of the right bank was in contemplation, apparently, retired his division towards Verdun, blowing up the bridge over the Meuse at Bras on the way. The Germans were thus in a fair way of dominating the northern and north-eastern defences of the town. Their air service had up to this time been much superior to the French.

General Pétain Takes Command.

From the night of the tragic 25th February, 1916, the story of the defence of Verdun may be conveniently divided into two parts, each involving a period of similar vital importance, but of unequal length, distinguished by the two names of the commanders, Pétain and Nivelle, under whom in succession Verdun was so tenaciously defended and finally relieved from all menace of capture.

General de Castelnau at Souilly, on the 25th, obtained General Joffre's authority by telegraph to appoint General Pétain on his arrival (the same evening) to the command of the R.F.V. and of all the reinforcements that would be sent there, with orders to defend Verdun on the right bank.[1] Pétain's Chief of Staff, Colonel de Barescut, had already reached Souilly. After a night of hard work, with General Herr attached to his staff as his deputy and very useful artillery chief, General Pétain issued his first order at 6.0 a.m. on the 26th: Bazelaire, with at present two divisions, to command on the left bank. General

[1] He said to M. Madelin the same day: *"Non seulement Verdun ne sera pas pris, mais je peux vous dire pourquoi: c'est qu'il ne faut pas que Verdun soit pris."*

Balfourier to command on the right bank with three Groupements: west to east, Guillaumat (Ist Corps) Côte du Poivre. On his right, and including Douaumont Village, Vaux and Damloup, the Groupement Balfourier (XXth Corps) of three divisions and two brigades. On the Hauts de Meuse, the Groupement Duchesne (IInd Corps) of four divisions and two brigades.

Thus at this moment there were eleven divisions and four brigades in the R.F.V., and under orders to join were the XIIIth Corps (Alby), XXIst Corps (Maistre), XIVth Corps (Baret), and IIIrd Corps (Nivelle), to be followed before the end of March by the XIIth Corps (Nollet), XXXIInd Corps (Berthelot) and XXXIIIrd Corps (Nudant). For the supply of this force of, in round numbers, at least 500,000 men, with food, ammunition and *matériel* of all kinds, there was but one narrow gauge railway available, for the Meuse Railway had been cut by the occupation of St. Mihiel and the Rheims Railway by artillery fire at Aubréville. This was the awkward problem that had to be at once solved.

The narrow gauge railway running through Souilly from the Ornain was taken in hand, and its capacity increased soon to 1,000 tons a day. But this was altogether insufficient for the supply, reinforcement, and relief of so large an army as must be, for an indefinite period, the Army of Verdun. Commandant Richard of the Engineers of the Second Army, directed, on the 25th, to make an examination of the 30 miles or so of main road from Bar-le-Duc to Verdun, reported on the 26th evening "*la route tiendra,*" and these three words must have removed a weight of anxiety from the mind of his seeming imperturbable Chief. There was thus no immediate necessity for evacuating the right bank.

For four months (till the opening of the broad gauge railway) the Bar-le-Duc—Verdun road became, as M. Barrès has called it, *la voie sacrée*. Six thousand motor lorries passed over it, going and returning, every twenty-four hours. Any given point on it was passed by a vehicle every twenty-five seconds; 3,000 Territorials were always at work repairing it, and 700,000 tons of metal were thrown on it during the ten months the defence lasted. The Meuse was bridged *ad infinitum*.

But in view of the pressure on this road, a broad gauge railway was urgently required. Pétain asked for one to be begun from Revigny (a railway junction for main and light lines about 10 miles north-west of Bar-le-Duc and 35 (railway) miles from Verdun) to Verdun, and on the 26th February De Castelnau ordered it by telephone to the *Direction de l'arrière*. It was opened to traffic for munitions about the middle of June.[1]

Having organized the defence as regards command and dealt with the vital question of supply and transport, General Pétain now turned his attention, on the 28th, to improvising new fortified lines. Two

[1] M. Gillet gives 10th and M. Madelin 21st June as the date of the opening of this railway.

were marked out on both banks, and a few days later two more intermediate lines. A whole division (the 59th of the Ist Corps) was detailed for the work: 10,000 men with picks and shovels! The inactivity of the enemy on the left bank (till 6th March) gave the necessary time to get some of this work done without interruption.

The Struggle for Douaumont Village (27th February-4th March.)

An attempt by the French XXth Corps to retake the fort having failed[1] and, on the other hand, the Germans having succeeded in occupying the fortified post of Hardaumont, north-east of Douaumont, the fighting for the next five or six days centred in and around this latter village. Although local, it was of a particularly intense and desperate nature.

On 2nd March a fresh attack, launched after five hours' artillery preparation, was repulsed, but in the evening the French had to retire fifty yards.

On 3rd March a French artillery preparation reduced the village to ruins, and after desperate fighting, lasting till 10.0 p.m., the Germans were driven out. But at daybreak on the 4th the enemy counter-attacked in force, and the five days' struggle closed at 9.0 a.m. by the French retiring to entrenchments 200 yards to the south and remaining there.

The First Attack on the Left Bank (6th-18th March).

The situation on the left bank, after the 25th February, was somewhat singular, for while the French right rested on the Meuse at Forges, on the other side of the river the enemy's advance had carried the German right to Vaucherville, 3½ miles farther south. The salient so formed had raised difficulties for the Germans, but at the same time it had enabled them to bring a cross-fire on it from their artillery positions at Montfaucon and the Bois des Caures.

The true French position for defence was the second line: Morthomme, comprising Heights 265 (metres) and 295 (the latter separated from the Meuse by the Corbeaux and Cumières Woods and the Ravine des Caurettes)—Hill 304—Avocourt Wood, and the village of Avocourt.[2] Nevertheless, when, on 6th March, after a short bombardment, the German VIth (Reserve) Corps, supported by a division of the Xth Corps, attacked, the French put up a strong resistance on their first line. Forges was soon lost, but it was not till 10th March that the enemy held definitely the Corbeaux Wood, while all the Béthincourt—Malancourt part of the first position remained still in the possession of the French. The enemy's effort was, in fact, concentrated against the French right, where the woods and ravine seemed to favour an advance to the rear of Height 295. The first direct attack

[1] Colonel Joulia, who was directing the attack of the 28th, was killed as the advance began.

[2] The extreme left of the R.F.V. was at or about Avocourt. Farther west, units of General Humbert's Army guarded the front.

on the Morthomme did not begin till the 14th. On this date the enemy scored another slight success. The French 75th Brigade of the 25th Division (Debeney), after being subjected to a heavy bombardment with asphyxiating shells and losing one colonel and three lieutenant-colonels, had to abandon Height 265, which juts out towards the Forges Brook, about half a mile to the north-west of Height 295 (the key of this part of the second position—see map). A counter-attack on the 15th relieved the situation, and although the enemy attempted further progress both on the 16th and on the 17th, the combat ended on 18th March with a distinct check to the attack.

The First Attack on Vaux (16th-31st March).

On the right bank of the Meuse the Germans, after gaining possession of Douaumont Fort and Village, soon pushed their attacks farther south against Vaux Village and Fort, the capture of which were necessary to them in order to secure their positions already gained and to facilitate further progress against the second line of permanent defences: Forts Souville (388 metres, the same height as Douaumont), Tavannes and the fortified position of Froidterre, between Souville and the Meuse, south of Bras. The attack of 16th March was preceded by operations aiming at the occupation of the village of Vaux (9th-11th). Failing to rush the village, the attackers then took four days in preparing an assault on a grand scale. Five assaults on the 16th and six on the 18th, the assailants employing liquid flame, failed to dislodge the French, who on the 19th cleared the village of the enemy.

After this check further preparations. On the 31st the Teuton attacked again with fresh troops (121st Division) and again failed, the defenders still holding a great part of the village, with the pond, dyke and mill west of it. General Maistre (XXIst Corps) commanded on the right bank from the 7th March till towards the end of the month, when he was relieved by General Nudant (XXXIIIrd Corps).

The Combat of Avocourt (20th March-1st April).

Checked in their attack on the Morthomme (18th March) the Germans abandoned for the time being their attempts against the French right, on the left bank, and planned a turning movement through the woods to the west of Malancourt against the extreme left of the *Région Fortifiée de Verdun*. Could they seize the village of Avocourt they might from there penetrate to Esnes in rear of the formidable position of the Height 304. This wide envelopment entirely ignored, it will be noticed, the French first position on the Forges Brook at Malancourt—Haucourt and Béthincourt, which latter village held out till the 8th April.

The 11th Bavarian Division (which had been present at Mackensen's Dunajec victory in Galicia) was detailed for the operation, which was to begin on 20th March.

Generals Herr and Bazelaire, quite aware of the importance of Avocourt, had covered this flank with a triple system of barbed wire

entanglements, with a closed redoubt as reduit. But the German plan would seem to have been based on very precise information furnished by deserters, for a whole French brigade was surprised, surrounded, and forced to surrender, before its commander had time to intervene. He was besieged in his dug-out without having heard a shot fired.

Avocourt Village was a vital spot, not only on the left bank, but of the whole R.F.V., and had to be held at all costs. Under General Pétain's orders, Bazelaire succeeded on the 21st in repulsing the Bavarians and in reoccupying the south-east corner of Avocourt Wood. Repeated enemy attacks from the 22nd to the 31st failed to again evict the French, who on 1st April were left at last in undisturbed possession of a part of the Wood, sufficient to cover effectively the left flank of Height 304. This was at once strongly fortified.

On the Forges Brook, Malancourt fell on 31st March, after a house-to-house resistance, but Haucourt, half a mile south of it, remained in French possession till the 5th April.

On the Right Bank in April (Nivelle and Mangin).

The village of Vaux, with its pond and dyke, closed the entrance to the ravin du Bazil, through which ran the railway to Fleury and Verdun. Two other little valleys branched from the pond, north and south, called respectively the ravines of Fausse Côte and Fontaines. Westward and to the north of the railway is another valley (running into that of Bazil) and wood, leading down from Douaumont Fort, known as the ravin de la Caillette.

On the 2nd April the Germans turned Vaux by the ravin de la Caillette. Then it was (on the 3rd) that a brigade of the IIIrd Corps (Nivelle), just arrived, counter-attacked in the Caillette Wood, and by the 5th cleared it of the enemy. This brigade belonged to the 5th Division, commanded by General Mangin.

General Nivelle now commanded on the right bank, and the spirit of the offensive began to animate the French Higher Direction.

After clearing the Caillette Wood on the 5th April, General Mangin continued methodically his offensive, gaining ground on his left by the capture of an epaulment in front (north) of Thiaumont on the 10th (on which date the enemy failed in an attack on the Côte du Poivre, on the other flank) and on the 19th by quite an important success on his right in taking the redoubt on the Fausse Côte, with 300 prisoners, flammen-werfer and machine guns. During the remainder of the month the French were engaged in holding what had been won against repeated counter-attacks by the enemy, who also tried a diversion at Eparges (10 miles south-east) with no appreciable results.

Renewed Attacks on the Left Bank (9th-30th April).

With the occupation of Bethincourt on 8th April, all the French first position was now in German hands, permitting an attack of the second position from all points simultaneously.

In anticipation of this event preparations had been made by the enemy surpassing in importance all that had been done on either bank

since the 21st February. On the left bank alone five divisions were made available, the VIIth (Reserve) Corps being reinforced by the 22nd, 105th and 63rd Divisions, while across the river the VIIth Corps, in close co-operation, was to attack the Côte du Poivre. This attack was launched on 9th April and continued on 10th April, with generally indecisive results: on the flanks complete checks, at Height 304 little impression, only on the Morthomme anything serious.

On the Morthomme, at the close of the day on the 10th, the enemy had succeeded in considerably enlarging his previous inroad (on 14th March). Rendered untenable by concentrated artillery fire, Height 295 had to be evacuated, the French entrenching themselves 200 yards in rear at the edge of the reverse slope. Attempted turning movements, made in great force, by the ravin des Caurettes had been defeated with heavy loss.

General Pétain wrote the same evening: *"Courage! On les aura!"*

Nevertheless, a serious situation had arisen. Unless Height 295 could be recovered, affairs might easily become critical.

General Berthelot, who was now in command on the left bank, after certain reconnaissances, counter-attacked in force (XXXIInd Corps) on the 20th and retook Height 295, establishing his front where it had been on the 10th. Successive German attacks only resulted in heavy losses for the attackers, the 43rd Division being decimated.

By the 1st May the French second position on the left bank of the Meuse was practically the same as on 8th April.

The French forces in the R.F.V. in April were distributed, left to right, as follows: XIIIth Corps (Alby), Avocourt; XXth Corps (Bazelaire), Height 304; XXXIInd Corps (Berthelot), Morthomme to the Meuse; XIIth Corps (Descoings), Meuse to Douaumont; IIIrd Corps (Nivelle), Douaumont to Eix; XIVth Corps (Baret), Eix to Eparges; IInd Corps (Duchesne), Eparges to Fort Paroches.

On or about 1st May, General Pétain was promoted to the command of the Centre Group of Armies, General Nivelle to the Second Army (Army of Verdun), General Lebrun to the IIIrd Corps, and, on the 14th, General Nollet (vice Descoings) to the XIIth Corps.

The Nivelle Period (1st May-15th December).

The principal combats, or series of assaults, that can be classified under one heading in this period are as follows:—

(i) Desperate assaults on the second position of the left bank (3rd to 31st May). French offensive against Douaumont Fort takes the pressure off the left bank (22nd to 26th May).
(ii) The second attack on Vaux.
(iii) The great assault (right bank) of the 23rd June. (Question of the evacuation of the right bank.)
(iv) Desperate combats for Thiaumont and Fleury (1st July-17th August).
(v) French seize the initiative. Mangin in command on the right bank. The French offensive 24th October (6,000 prisoners).
(vi) Battle of the 15th-18th December (12,000 prisoners).

On the Left Bank (3rd-31st May). French Offensive Against Douaumont Fort (22nd-26th).

Exasperated by their recent reverses at the hands of Generals Berthelot and Mangin, the enemy lost no time in entering upon another big effort against the French second position on the left bank of the Meuse.

It began in the night of 2nd-3rd May with a forty-eight hours' concentrated bombardment (by 500 guns) of Height 304. The atmosphere was obscured by it at 2,000 feet up. Infantry fighting took place on the night of 4th-5th May and following day, and again on the 7th, without result, although elements of five divisions attacked both front and flanks of this position, copses facilitating approach. From the 13th to the 16th a whole corps, the XXIInd, attempted the assault in vain. On the 22nd the enemy's supreme effort to take the 304 position, directed this time against Avocourt, met there with the same indomitable resistance. But possibly this last attack may have been in the nature of a diversion. Because, on the 23rd, a fresh corps, the XIth, with another division in support, attacked the Morthomme, already somewhat encroached upon, rushed Height 295, and penetrated into the Caurettes ravine.

On the 28th the French held Cumières (see map), but had lost the summit of the Morthomme. On the 30th the enemy had all but turned the position, reaching the Chattancourt Railway Station, when at this critical moment General Berthelot launched a successful counter-attack on the head and flank of the German outflanking division and regained Cumières, barring the Caurettes ravine.

It may be added here, as space prohibits further reference to the left bank operations, that on 15th June the French recovered the Morthomme and established their front more firmly than ever on their severely-contested second position.

In order to relieve the pressure of the enemy's undivided attentions to the left bank, General Nivelle caused to be prepared and executed on the 22nd an attack in force on Douaumont Fort, the greater part of which was taken by the 5th Division (Mangin) on that day. But the left of the attack being unable to advance, or make any progress against the German trenches to the west of the Fort, its capture had to be relinquished on the 26th. All the honours of the affair remained with the 5th Division, whose commander profited by the experience when planning and executing the attack of the 24th October.

The Germans Take the Vaux Fort (7th June).

The imminence of the British offensive (on the Somme) forced Von Falkenhayn, according to his own account, to the definite conclusion that if the situation on the right bank was to be advanced, and Douaumont Fort secured against further French enterprise, it must be accomplished during the month of June. Moreover, nothing could better prevent the French reserves from taking part in the expected Allied offensive elsewhere than vigorous action against Verdun.

Von Lochaw (formerly IIIrd Corps), who commanded the Germans on the right bank,[1] had available for the attack on Vaux and for the subsequent operations, four fresh divisions, including the so-called Alpine Corps, besides the Ist Bavarian Corps and the 50th and 1st Divisions.

On 1st June five of these divisions attacked the French front from Thiaumont to Damloup, on a front of only 3½ miles. Each division had two of its regiments in first line and the third in reserve. Each regiment, similarly, had two of its battalions in first line with the third in support. On the German right, against the French XIIth Corps (Nollet), the Bavarians failed. On their left, against Damloup, the 50th Division was equally checked. But the centre attack was successful, German infantry after having forced their way through the Bois de la Caillette, and over the Bazil ravine, penetrating into the copses on the slopes of the Vaux Plateau.

With the fall of Damloup, on 2nd June, the fate of the Vaux Fort was sealed. Its siege, the situation of the garrison, their sufferings and tenacious heroism are recorded in " Les Derniers Jours du Fort de Vaux" (Paris, Plon), by le Capitaine H. Bordeaux, de l'Académie Française. (See also the R.U.S.I. JOURNAL of February, 1917.) The capture of the Fort of Vaux was the signal for a strong enemy attack on the Thiaumont sector by the Alpine Corps and a division of the Ist Bavarian Corps. The farm was taken on the 9th and several of the works on the 12th; but there was no real rupture of the front, and on the 15th, when the fighting began to slow down, the French still held firmly their positions along the high ground from Bras to Fleury. General Mangin, appointed to the XIth Corps, relieved General Nollet in command of Froidterre sector, on the 22nd, the eve of the great assault.

THE GREAT GERMAN ASSAULT OF THE 23RD JUNE.

While striving by all the means in their power to keep up the spirit of the troops, both Pétain and Nivelle regarded the situation as serious, especially so on the right bank, and as a precaution the evacuation of that bank was secretly organized. But from Joffre downwards such a course was regarded only as one of the very last necessity. The approaching Somme offensive was counted on to relieve the pressure on Verdun shortly.

A terrific bombardment by the greater part of 2,000 guns[2] (of which 1,200 were heavy) preceded the assault of the 23rd June. M. Gillet compares its effect, as regards sound, to Niagara at the moment of the break-up of the ice on Lake Superior. At 7.0 p.m. on the 22nd, after forty hours, it rose to crescendo, and was followed during the night of the 22nd-23rd by a deluge of asphyxiating shells. The assault

[1] Von Gallwitz commanded on the left bank until July, when he was appointed to the command of the First Army on the Somme. Von François relieved him before Verdun.

[2] Over 2,000 was the estimated number of the German guns in action at this time against the northern front of Verdun on both banks of the Meuse.

was delivered soon after daybreak by a total of nineteen regiments on the same narrow front—if anything somewhat contracted—as on the 1st June. The higher units engaged were the Xth, Alpine (four regiments), XVth Corps, the 103rd, and a mixed Bavarian division.

As on the 1st June, the French resistance was successful on the flanks, but gave way in the centre about Thiaumont, where the whole system of defence had been pulverized by the bombardment. By 8.15 a.m. the Germans were in Fleury, and by 9.0 o'clock a Bavarian battalion was attacking the earthworks of Froidterre. But this inrush by German first-line troops could not be supported by the reserves. The French artillery fire checked all attempt at reinforcement, and the Bavarians had soon to relinquish their footing on Froidterre. By noon the battle was again stationary, and the German gains were reduced to the greater part of the Thiaumont position and Fleury. Elsewhere the assaulting wave had, as it were, dashed itself vainly against a granite wall.

Desperate Combats for Thiaumont and Fleury (1st July-17th August).

The sectors of command had been enlarged since April and were now known by letters of the alphabet. Sector D, commanded by General Mangin, comprised the whole of the right bank from the Meuse to Damloup. This, the first really important command confided to this remarkable *homme de guerre*, since so renowned, became permanent from this date. Up till now in the world-war, General Mangin's long experience and many wounds gained in African warfare had done him little good. He would appear to have been underrated as a *général d'Afrique*. Verdun and General Nivelle gave him his opportunity.

From 23rd June to 15th August the Alpine Corps occupied Fleury and even pushed a detachment for a few days (12th-17th July) as far as the Chapelle Sainte-Fine, close to the Souville Fort. The plateau Douaumont—Froidterre (averaging 340 metres in height, the highest points being Douaumont Fort and Souville Fort, both 388 metres) pushes a branch south-east from Thiaumont to Souville. Fleury[1] is situated on this ridge, along the crest of which the road ran from Thiaumont to Souville. The Chapelle Sainte-Fine was situated where the road from Vaux to Verdun crossed it. East of the ridge was the ravin de Bazil, in German hands, and to the west of it the ravin des Vignes, which served as the approach for the French reinforcements.

On 12th July Fleury was entirely occupied by the enemy, but the French recovered the Chapel during the night of 17th-18th July. Thiaumont (the principal work), retaken on 27th June, had been again lost on 4th July. By the 15th of the month the Somme offensive was beginning to have its effect upon the general attitude of the enemy before Verdun. But, nevertheless, in this particular sector, from

[1] Fleury, presumably, is being rebuilt. In 1916 it was levelled, like Lens.

Thiaumont to Fleury, the struggle continued intense for another month, although the French were, generally speaking, on the offensive. On 3rd August they took 3,000 prisoners, retook Thiaumont, and obtained a footing in Fleury.

8th August saw the last flicker of the German will to conquer Verdun. On the 15th Fleury was wrested from the invader, who was henceforward compelled—by direct order of Hindenburg—to observe a strictly defensive attitude.

The desperate nature of the fighting in the Thiaumont—Fleury sector during the first half of August, 1916, may be realized from the narrative of the experiences of the 81st Regiment of the line.[1]

Brought up to the ravin des Vignes on the night of the 3rd-4th in relief of the 96th Regiment, the 2/81st was in the front line, and actually engaged from the 4th to the 9th inclusive. It was reinforced by the 1st Battalion on the night of the 4th-5th, when the 3rd Battalion relieved the 2/96th at Thiaumont. The latter battalion had recaptured the principal work there on the evening of the 3rd and had held it against a counter-attack, which, however, swept the remainder of the 96th off the Thiaumont—Fleury ridge.

The semi-permanent fortifications of Thiaumont were of the latest model. Besides the centre and principal work or reduit, there were three detached works (X, Y and Z) and several batteries, magazines and *abris*. Of these the work X and the *abri* P.C. 119, to the south of the Fort, had alone remained in French hands since 4th July, till the victory of the 2/96th on the 3rd August.

On the 21st the survivors of these glorious regiments (81st and 96th) were reviewed by the Commander-in-Chief, and their regimental Colours decorated with the *Croix de Guerre*.

The French Offensive of 24th October-2nd November. Recovery of the Forts.

Although in the measures taken since the end of April for the defence of Verdun the responsibility lay with General Nivelle (who, by the way, is half English), to whom in consequence fell the chief credit, quite rightly, for the successes eventually obtained, it was General Mangin who made the plans and commanded the troops on the right bank of the Meuse, from the Côte de Poivre to Fort Tavannes. His headquarters were in a suburb of Verdun, where he occupied a villa belonging to a corn merchant. Here in a large room, furnished only with a few chairs and a table, on which was a model of the ground comprised in his command, he made his plans, issued his orders, and conducted necessary business.

M. Gillet, the author of "La Bataille de Verdun," in another publication or article quoted with admiration by M. Maurice Barrès, has thus described the General at work:—

"Le salon, clair, spacieux, lui servait de cabinet de travail. Un rideau fait de toile de tente mettait derrière lui un vague décor arabe.

[1] "Les Archives de la Grande Guerre," June, 1920.

. . . Ce masque de lion maigre à crins noirs, à regard d'acier gris, semblait épanoui. C'était l'heure où il méditait son redoubtable coup d'Octobre. . . Il avait l'air du fauve qui se prépare à la chasse. . . . Au Général Joffre qui viendra le voir dans son poste de commandement le matin de l'attaque, il dira 'Dans deux heures, mon général, Je vous livre 22 bataillons allemands.'"

For another month after the recapture of Fleury the French continued to make local attacks here and there on the right bank, for the consolidation of their gains in view of possible future enemy aggression. But, on 29th August, Hindenburg succeeded Falkenhayn as Chief of the Great General Staff, and his policy was to liquidate as soon as possible the Verdun failure, for which he was in no way responsible.

When, therefore, on 15th September, General Mangin—it having been decided that the troops should undergo a special training—ordered all attacks to cease, the result was, for the first time since the 21st February, complete calm—favourable to a full consideration of his plans. These were, in fact, considerably extended in scope by General Nivelle's criticisms, and when finally approved, on 9th October, they included the capture of Fort Douaumont and the capture, or masking, of Fort Vaux.

The offensive thus planned was delivered on 24th October, after three days' artillery preparation by 650 guns, of which 12 were of 15-in. or 16-in. calibre, throwing shells of over half a ton in weight. Douaumont received 263 of them and Vaux 144! The three divisions in front line, favoured by fog, reached their first objectives almost without loss, except at one point where a battalion, having been ordered to leave its trenches temporarily for safety towards the end of the artillery preparation, saw them suddenly occupied by the enemy.

After a halt of an hour and a half, the advance was resumed, pivoting on the 11th Regiment (38th Division) at the Haudremont Quarries (half a mile to the north-east of Bras). Fog still prevailed to such a degree that the enemy could neither range his artillery nor keep connection properly in his new position.

Douaumont Fort was on fire, a 16-in. shell having fallen in the centre of a depot of benzine and rockets. This fire apparently caused the Fort to be evacuated, and the French were into it before its defence could be again organized. At 3.30 p.m. the Fort was entirely in French possession with 45 prisoners (one captain) and 10 machine guns.

Vaux Fort was occupied on 2nd November, evacuated by the Germans just as another assault was about to be delivered by a fresh division, the 63rd. The whole line of the forts was thus recovered, and the front now ran as on the 25th February. The captures in men and *matériel* were 6,000 prisoners, 15 guns, 144 machine guns, and 40 trench guns.

On 24th October the fog cleared at 3.0 p.m. This fog was at first thought by the French to be a misfortune, as it prevented aerial observation and control of the moving barrage, but it proved, on the whole, a great advantage for the attackers.

THE VICTORY OF THE 15TH-16TH DECEMBER—BATTLE OF LOUVEMONT.

Following the example of the British on the Somme, the French now employed their aviation tactically—as well as for observation and aerial combat. General Mangin had 150 aeroplanes organized for attacking trenches with bombs and machine-gun fire. The success of the 24th October-2nd November could not be exploited earlier than the 5th December, on account of the scarcity of ammunition for heavy guns.[1] It was necessary to wait and economize the daily allowance. But after the artillery preparation had begun on 29th November it had to be stopped, and the offensive postponed owing to the persistently wet weather.

Taking advantage of the knowledge thus gained—that the French were preparing another attack—the Germans, in order to forestall it, launched one themselves on 6th December against Hill 304 on the left bank. This coming more or less as a surprise might have seriously interfered with the French plans, had it not been too successful. Hill 304 was taken, and a sharp salient driven into the defender's front towards Esnes. But that was all. There were no reserves to develop the success.

Nevertheless, the loss of this fine observatory and the threat towards Esnes caused General Nivelle to hasten operations, which would now be in the nature of a counter-attack, on the right bank. The weather clearing on the 9th he at once ordered the four assaulting divisions to be brought up to Verdun (by train and motor lorry) from their exercise camps to the south and south-west of the place.

The artillery preparation by 740 guns (340 heavy) was long and arduous. There were no tanks and the hostile aviation was efficient. It was not till the third day that the superiority of the guns of the attack became at all marked.[2] The ruse was employed on this occasion, as during the preparation for the October attack, of suddenly increasing the range, as for a real attack, in order to cause the enemy to disclose the position of concealed batteries.

The infantry attack was delivered at 10.0 o'clock on the morning of the 15th. Four divisions (126th, 38th, 37th, and 133rd), in the order named from left to right, advanced on a front from the Meuse (southern edge of the Côte du Poivre) to Vaux. Obviously, as the objective of the 133rd Division (Passaga) on the right was Bezonvaux, and that of the 126th on the left Vacherauville, as soon as this latter village was taken the 126th Division became the pivot of a great wheel to the left. Louvemont, its plateau and works, and the Chambrettes Farm were the other objectives.

Vacherauville, almost all the Côte du Poivre, and Hill 342 (south-west of Louvemont) were taken by 10.45 a.m.; Louvemont and its plateau (38th Division) by 11.30 a.m., but the Chambrettes Farm and the approaches to Bezonvaux proved far more formidable and difficult

[1] General Mangin asked for 150,000 rounds for his 6-in. guns, and could only get 15,000, in addition to the daily allowance of 6,000 rounds.

[2] Seven deserters surrendered on the 14th, stating that they were all that was left of their company.

of capture. The 133rd Division had traversed nearly a mile in glorious fashion, sweeping over the Hardaumont[1] camps and taking 2,600 prisoners, before being brought up against the trenches Weimar and Chemnitz, situated on the broad Spur 380 (about three-quarters of a mile south-south-west of Bezonvaux), which commanded all the approaches.

Similarly, the 37th Division on its left was unable to get farther than the Bois de la Vauche.

Thus, at the end of this day, the French front ran, from left to right, Vacherauville—Louvemont Village and the plateau of Louvemont to within 300 yards of the Chambrettes Farm—Bois de la Vauche—Wood of Hardaumont. The enemy's position on several miles of the front had been completely pierced, 9,000 prisoners taken, and 115 guns captured or destroyed.

The first advance suffered but slight loss, as the reserves marched with the front line, taking up their distances later. Owing to the adoption of this plan the enemy's artillery barrage, launched two minutes after the advance had begun, was wasted in the void.

On the 16th, before it was properly light, General Passaga, commanding the 133rd Division, turned Spur 380 by sending a battalion round to the east of Bezonvaux and taking that village by surprise. At the same time he vigorously attacked the Spur on the other flank, from the Hassoule Wood. These manœuvres were attended with complete success, although at one time 600 prisoners (who had surrendered at once to the left attack), having seized their arms, fired into the rear of the Bezonvaux battalion, causing some temporary confusion.

With the exception of the Chambrettes Farm the whole of the Louvemont—Bezonvaux position was in the hands of the French, together with more than 2,000 fresh prisoners, making 11,387 in all, including 300 officers.

The Chambrettes Farm was invested and fell in due course, forty-eight hours later, on the 18th December.

The final victory as regards Verdun had been won.

It is worthy of note that General Mangin in his recently published book has placed on record his opinion that it was to Marshal Joffre's influence that the successful defence of Verdun was mostly due. He insisted on the retention of the right bank, and afterwards an offensive action when others were inclined to give way.

[1] Hardaumont is east of Douaumont, about 1½ mile. Haudremont is about the same distance to the north-west.

DANGER VALUES.

By Lieut.-Colonel M. F. McTaggart, D.S.O., 5th Lancers.

(A Lecture delivered at Risalpur and Peshawar.)

THOSE of us who have been through the late War, and particularly those who served in France and Belgium, cannot fail to have been impressed by the number of preventable casualties which occurred. Some men are foolhardy, others over cautious, and some wear themselves into nervous breakdown for no reason at all. What the proportion was through those years of hard fighting it is impossible to say, but there is no doubt that it was very considerable. The matter does not, however, rest entirely on the question of saving casualties, it has another still more important bearing. If every man going into an attack were thoroughly conversant with the limitations as well as the effectiveness of the weapons opposed to him, there would rarely be a position which could not be taken. If we could teach our men to think "objectively" always, we should go a long way in making ourselves the most formidable troops the world has ever seen.

Generally speaking, we are too apt to think "subjectively" or to reason from our own side of the question; thinking "objectively" is to reason from the enemy's point of view. In philosophy it would be called "a priori, and a posteriori ratiocination." I hope you will not call it this. The subject will do you no harm and deserves a better fate.

What we do mean, in simpler language, is that we should argue from the effect to the cause, rather than from the cause to the effect. We should not want to say, "I am frightened, therefore there is danger." But rather "If there is no danger then I have nothing to fear."

That is the great difference, and it is not merely a question of twisting terms, or of academic dialectics, but it represents a hard fundamental fact in warfare which applies to us all in the battlefield with a force no one can dispute.

I can give no better advice to any soldier, be he young or old, than that he should learn from the outset of his career to think "objectively," to puzzle things out for himself, not from his point of view, but always from that of the enemy.

I have often heard it said that the chorus girl in the back row takes just as much care over the twist of a curl or the pencilling of an eyebrow as the *première danseuse* herself, because she believes that every eye, from the stalls to the gallery, from the boxes to the pit, are all fixed on her.

I will hastily add that I make this statement on purely hearsay evidence. (No doubt there may be some officers present who have

greater knowledge on this matter than I, and it would be interesting to hear their experiences on the termination of the lecture.)

As with the chorus girl, so it is with the soldier. As he advances in the face of the enemy he thinks that the whole opposing army is thinking of him, and of him alone. Both are thinking "subjectively," neither have been taught "objective" reasoning.

I remember once being under very heavy machine-gun fire. I quickly dived into a shell hole, where there was another man, and awaited events. I was pondering what I should do next, as I thought it was far too dangerous to put one's head up, when my companion got up and walked quietly away, without a shot being fired at him. You see, I had been thinking "subjectively." I had been imagining that my shell hole was the only "pebble on the beach," and that I was the only person the enemy had to think about. When I did get up I realized how foolish my fears had been.

It is, therefore, always worth while to reverse the picture when training our troops in peace time.

If we were to place a man on the 800 yards firing point, and ask him to try and hit a very quickly moving, almost invisible, target, he would probably say, "Oh, you can't expect me to hit that, can you?" If so, the reply should be, "Very well then, remember how safely you could move in the face of the enemy, who wouldn't be firing under the ideal conditions you are at the present moment." When we are training men in the attack, let us try to get them to place themselves mentally in the position of the defence. When practising the defence let us show them the advantages and limitations of the attack. In the defence we should point out how easy it is to hit a man who needlessly exposes himself, and how impossible it is to stop one who takes any advantage of cover. Then with this lesson in his mind, make him advance, and he will all the more readily believe that he can do so with impunity, provided he obeys the rules he has learnt from personal observation.

Let us now take the various aspects of movement under fire under separate headings.

Sniping.

In all cases of sniping, the firer has first of all to "spot" his target, secondly he has to aim, and thirdly to fire. All this takes a considerable time. Ten seconds is probably as quick as it can be done by an expert, and very considerably longer when the conditions for firing are not of the best. It sometimes happens that the sniper keeps his aim permanently on one spot, and lets drive the moment a target crosses his sights, but this can only be done for short periods (unless a rifle rest is used, which is not often very satisfactory), and when many people are observed continually crossing that spot.

If, therefore, we arrange not to expose ourselves often at the same spot, it is perfectly safe to do so for a period of from 3 to 5 seconds, which gives a sufficiently large margin for safety. This rule, simple enough in itself, was undoubtedly insufficiently grasped during the trench warfare in France. It was no uncommon thing to walk along

the whole front line of a unit and to find the N.C.O.'s in charge of posts to have no further information of the ground they were to guard than what could be obtained through a periscope. The result being that they knew nothing about it whatever, and as often as not could not tell our own line from that of the enemy. But an occasional glance over the parapet lasting only three seconds (from some spot slightly away from the sentry post) would not only have been perfectly safe, but they would have learnt more in those three seconds than from a week of gazing through a periscope.

Furthermore, should any officer happen to use that means of obtaining the information when going his rounds, he would very likely gain a reputation for bravery, although the risk he would run would be almost negligible.

To many a man bravery has been accorded and decorations won by a thorough appreciation of danger values. The man who realizes to the full the limitations of the enemy, and takes no unnecessary risk can apparently perform prodigious feats of valour, with successful issues, and yet be as safe as anyone can in the face of the enemy. And it should be our object to raise the general standard of any fighting soldier to this level.

In the year 1914, when the Ypres salient was looked upon as a regular death-trap, there was a time when a certain unit had to hold a part of the line which could be sniped from all four points of the compass. The casualties which had occurred from this source had been so heavy that few people dared to move about at all. There was one officer, however, who walked about as he liked and appeared to be living a charmed life, and continued to perform his duties quite unconcernedly throughout the whole time the unit was in that sector. Now the sector was surrounded with trees, and on being asked how it was he wasn't hit, he replied quite simply, "Oh, it wasn't possible for any sniper to hit me. I never stood still for a single moment, and if you yourself were to try sniping through trees, you would find out that it is hopeless to even try to hit a man unless he is stationary." That officer understood "danger value." It required no bravery to do as he did, because he knew he was in no danger. It was simply applied knowledge, and that is what it must be our object to teach.

The cavalry soldier, too, should also be made to realize when mounted how far he is in danger from sniping.

Directly fire of any sort is opened on a patrol, the tendency is for the men to start galloping as fast as they can, no matter what the range at which they are being fired. They usually gallop both far and fast, and a few well-directed bullets at long range will often send them scattering in all directions. It could, however, be laid down as a rule that at any range over 1,200 yards no greater pace is needed than that of the steady trot. Between 1,200 yards and 600 yards the pace might be increased to a hard gallop, and it would only be at ranges below the latter figure at which it would be necessary to gallop "ventre à terre." Should anyone doubt the advisability of such a rule, let them try on the range, and see what success they are likely to have at a target moving eight

miles an hour when firing at a 1,200 yards range, even when the range was accurately known and with a rifle that had been "calibrated."

Machine-Gun Fire.

This arm has been developed so much recently because its moral effect is very great, but when we come to look into the actual "danger value" of machine-gun fire, we shall find that it has been accorded a potentiality quite beyond the scope of its actual abilities. Machine guns trained on a defile, such as a sunken road, can be, and frequently are, very effective, and under circumstances such as that we are wise to take every possible precaution. But if we hold a similar view when facing them in open country, when attacking positions, or when pursuing a retiring force, it can only be because the limitations of machine guns have not sufficiently been explained or emphasized. During the War attacks have too often been held up by this weapon, not on account of the damage they have inflicted, but because their fire instilled inordinate respect. Machine-gun fire, unlike that of artillery, has neither the lateral effect of shell fire or the spread of shrapnel, the bullet must find its billet before any harm can be done. If fire is concentrated on one spot, then all other localities are free, and there is nothing to hinder the advance in other portions of the line. If it is traversing it is usually a simple matter to take cover, as the bullets come closer, and to advance directly they have passed. If the machine gunner is trying to hit definite targets his task is one of peculiar difficulty. If no man exposes himself for more than three or four seconds the advance can be accomplished with almost complete safety. It is on such occasions that section rushes should be avoided, as they often do present too good a target, but with what was sometimes called "a shell hole advance," in France, or perhaps more commonly the "dribbling" attack is the most effective method of nullifying machine-gun fire. Any man, after practising with his Lewis gun, should remember his own difficulties, and use that knowledge when advancing against them. Machine-gun fire in open country cannot hold up well trained determined troops. If men by short, sharp diagonal rushes move forward, taking cover only sufficiently long to regain their breath, and threaten the flank of machine guns, there will be little difficulty in capturing the position, and it was by this method that many guns were captured in France and Flanders.

Within reasonable limits it should be impressed on all soldiers that time is a most important factor in assessing danger values. It is twice as dangerous to take half an hour over an attack as fifteen minutes. But not only that, quickness of movement is again another factor of safety, so that it might almost be said that time works in a double ratio, and that an attack that only took fifteen minutes would be three times less dangerous than one of half an hour.

Gun Fire.

When under shell fire it is again very valuable to try to fathom the fire scheme under which the batteries have opened. Were our

soldiers taught to try and understand what the batteries are after when fire is opened, many lives would have been saved. Everyone who was in France must have seen a man walking down a trench frightened by a shell bursting just behind him. He then runs forward, only to meet the second shell bursting in front of him. Now thoroughly alarmed he runs back again, and is caught by the centre shell of the bracket, and so meets his death, which he could easily have avoided had he realized what the batteries were doing.

After all, the various forms of fire a battery can do are limited. When ranging, bracketing is the method universally adopted. They can concentrate their fire on one spot, as when doing counter-battery work, or when demolishing strong points. They can traverse or they can search and sweep, which is practically unaimed fire, a situation in which "danger value" cannot be appraised. Similarly battery fire, gun fire, salvoes, and barrage fire are also outside discussion in this paper. All that is necessary for us to consider when we are under shell fire is, What is the object of that fire? If we find shells unexpectedly falling in our direction, it is not necessarily, in fact it is improbable that it is directed at either infantry or dismounted cavalry. It is more likely it is aimed at a battery close by, or an observation post, or led horses, definite approaches, transport, etc., and if we move from that locality, we need, as a rule, have no further apprehension. But when we see the guns beginning to use shrapnel, which are bursting near us, then it behoves us to take more care. We then know that their fire has us as its special object, and we can only advance with all military precaution.

I remember once in France we had to advance a very long distance across the open under a perfect tornado of shells. We were, of course, in artillery formation, and we got through with the loss of only a half platoon. Every one who got through that advance thought themselves extremely lucky, but as a matter of fact it was only the unlucky ones who were hit, for the simple reason that the batteries were not firing at us, otherwise they would have used shrapnel. They were engaged solely in counter-battery work. When I explained this to my adjutant, after it was all over, he said, "Well, if I had recollected that, what a lot of nervous exhaustion I would have saved myself."

So you see the strain of battle is largely diminished by learning to think objectively, and its importance was daily brought home to us in France when our infantry were enduring shell fire for days on end. Those who could never read what was in the minds of the German gunners were never free from care, and nervous breakdowns were frequently the result.

Rifle Fire.

By far the most dangerous form of fire is that from well-trained infantry. Under such circumstances we cannot, as in the case of machine-gun fire, have any idea where the next bullet will strike. A good section of infantry firing at the rate of ten rounds a minute, with each shot falling in the required area, is the most effective form of

defence or of attack that a soldier can be called upon to face. However, fortunately for us, it is seldom we have to meet infantry so well trained, and the lessons that can be learnt when we are engaged in field firing are very valuable. As firing becomes more rapid, and the nerves of the firer beome more strained, the tendency to fire high increases, and it must be realized that inaccurate fire represents no danger whatever to those men who are the target at that moment. I think it must have been the experience of most of us to hear it said that advance is impossible for no greater reason than that bullets were whistling overhead. A bullet makes a considerable noise in the air, especially when close to "the crack," even when as much as 50 feet above our heads. If it were possible it would be an excellent lesson in peace time if we could place our soldiers in such a position so that they could learn what is dangerous and what is not. The dangerous bullet makes no sound, when we hear it we know that all danger from that source is past, and this point equally applies to all shells, except those from howitzers and other high-angle fire. With troops that are moving forward quickly, exposing themselves for very short periods, and taking every advantage of cover, their casualties will be slight. But once we give the enemy opportunity of locating our positions and of accurately ranging on them, we increase the danger very considerably.

From the point of view of "danger value" alone we should impress upon our troops that it is only when bullets begin striking the ground close beside us that any danger really exists. It may be said in opposition to this statement that owing to the flat trajectory of the modern rifle that the whole of the last 500 yards is the danger zone, and that a man may be killed by a bullet which would not strike the ground for 300 yards after it had passed him. That is certainly true theoretically, but it requires perfectly flat ground before it can work practically. Most positions that are attacked are on rising ground, so that the hostile fire often assumes that of a plunging nature. In an attack up a glacis-like slope where grazing fire would have full effect, we must not forget the strong covering fire under which the troops would advance, so that what is so dangerous theoretically becomes far less so in the actual battle. On most other occasions the ground is so broken that few bullets find their billet except those which strike where they are intended.

Our soldiers, therefore, should be made to realize the different values of fire, such as plunging, grazing, etc., by ocular and practical demonstration in their field firing practice, in order to make them understand that what is difficult for the firer is easy for the "firee," and *vice versâ*. Let them take as their motto: "The enemy's difficulty is our opportunity."

I came across a very good example of a lack of perspective in danger values in one division in France. I was taking over their trenches, and was much impressed with all the notices I saw at every turn. "Keep your head down, the enemy sees you," "Danger," "Look out," and so on were all over the place. Presently I was nearly knocked down by a man running breathlessly down the trench, as I

was coming up. I asked him what his hurry was about, and he told me that they had orders to always run at this point. The only reason I could see for this order was that owing to marshy ground the parapet was insufficient, but on the other hand, as there was a dip here in the ground, it was completely out of the enemy's view. On going round the line I found everyone in a similarly timorous attitude of mind, and during the daytime hardly a post was visited.

I need hardly say that this is the worst form of preparation for attack. When over caution is instilled in the defence we cannot expect a bold and resolute advance when the time comes. But if we always keep a well-balanced appreciation of danger values we shall find that, instead of erring on the side of hesitation, we shall be able to perform whatever duties we are called upon to carry out with the minimum of casualty and the maximum of dash and resolution.

Transport.

There is one other branch of this subject, which forms the last for discussion. Perhaps one of the most nerve-racking tasks of all is that of bringing up ammunition and supplies night after night. The actual danger on each particular occasion may not be very great, but some individual who has escaped injury for a week or a fortnight begins to wonder how long his "luck" is going to last, and if he escapes for a longer period than that soon begins to consider himself a particularly "lucky" individual. Many men's nerves break down under the strain of this sort of thing, and indeed it can be well realized what a strain it actually is. The danger varies, of course, under the circumstances under which it is done. Perhaps for a month or more there may not be a shot fired, while on other occasions there may be many casualties nightly. If, however, men were taught to think of the chances in their favour each time they went up it would considerably lessen their apprehension. Let us suppose that a man could reasonably admit that the chance of his being hit on one particular night was 3,000 to 1, we should try to get him to understand what a 3,000 to 1 chance means. If he had seen a lottery drawn with 3,000 tickets in it, of which he possessed one, I think he would feel how hopeless it was for his ticket to be the selected one. Most men would look upon their money as thrown away, and go away in despair, and indeed they would be well justified; 2,999 bad tickets to 1 right one is tremendous odds, and might well deter the most confirmed gambler from ever entering a lottery again. So if we could get our men to think of their "danger value" in this light I feel sure that they would be able to perform their tasks with lighter hearts and greater zest.

There is only one other concluding remark I would like to make, it is to suggest one other motto, not only for soldiers but it would equally apply to everyone—the soldier, however, in particular. It is this: "Never worry about what you can't help."

You will all remember that now quite celebrated cartoon of Bairnsfather's, of "Old Bill" and "Bert" in a shell hole, with shells

bursting all round. "Bert" is evidently suggesting they might change their position for some other, and "Old Bill" says, "If you know of a better 'ole, go to it."

Now here was a situation in which there was no decision required, no alternative, no way out of the difficulty, nothing else except "luck" —or call it what you will—could see them through. The only thing to do was to wait until the storm had passed and hope for the best.

This kind of thing is always occurring to a soldier in warfare. He often has to march along a certain road at a fixed pace; if it is through a town or village he will have no opportunity of moving to either the right or left. He can't help it, and so there is nothing to be done. He has got to take his chance, and like the man who has taken a lottery ticket there is nothing more to think of than to wait and see what number has been drawn. There is no decision to be made, and therefore there is nothing to worry about. We as soldiers should always try to steel ourselves to that view in peace time, so that in war we can keep our nerves under control, and with a due appreciation of "danger value" we will find we can do things easily we would have looked upon before as either foolhardy or heroic.

Nerves in war is much more a question of military knowledge than people have hitherto supposed.

If you doubt me, let us consider for a moment the arrival of the editor of a popular newspaper, or of some eminent politician into the so-called danger zone. He is seen creeping along the reserve trenches with a periscope, furtively glancing to his right and left, and hastily completing his tour of so-called inspection. His great ambition is to say he has been in danger—his greatest desire is to keep out of it. What he really likes is to have the burst of a shell pointed out to him in his neighbourhood, so that he can say that he has actually been under fire. He then hurriedly retires, and writes long articles about his thrilling experiences and the wonderful heroism he has seen.

Now, make no mistake. That man really does think he has been in danger. Having no military knowledge his appreciation of danger value is nil; he is quite incapable of deciding what is dangerous and what is not, and like many of us, perhaps I may say all of us, likes to just slightly exaggerate, provided he is quite sure that there is no one about who can or will contradict. So he comes back, rich in reminiscence and experience, and the dangers through which he has passed give proof to his valour.

You see, he does not know, and every private soldier who reads his reminiscences laughs openly at him. Therefore, I think we can definitely say that the more we know the better are we able to size up the danger.

The Safety of the Unexpected.

It is a curious psychological fact that when we encounter something entirely different to anything we have seen before, or an attack is made on us in an unexpected way, we become so engaged in watching the novelty, we can think of nothing else until, perhaps, too late.

An occasion of this sort occurred in France early in 1917, when the Germans were commencing to withdraw from the Somme salient. Orders came round to the battalions in the front line to discover, as early as possible, the evacuation of the opposing trenches. In one sector of the line all seemed quiet, and to test the matter one sentry after another was ordered to expose himself. Short periods to begin with, increasing in length if the enemy made no sign. Eventually the whole of the front line stood up on the parapet, and not a shot was fired at them. But a patrol which was then ordered to penetrate into the hostile trenches was opened on at once.

The enemy had apparently been much too interested in the novelty of seeing our men expose themselves in what might be described as so very reckless a way that they all forgot to fire, but when they saw a common patrol advancing across the open, they all knew what to do, and did it.

This is, therefore, another aspect of "danger value." We can do almost impossible things, provided they are sufficiently novel or unexpected.

THE OPERATIONS OF THE BRITISH ARMY, AUGUST–SEPTEMBER, 1914.

(Analysed from General von Kuhl's "Marnefeldzug.")

(General von Kuhl was Chief of Staff to the German First Army in August, 1914.)

KITCHENER AND FRENCH.—TRANSPORT AND CONCENTRATION OF THE BRITISH EXPEDITIONARY FORCE.

THE command of the British Expeditionary Force against Germany was entrusted to Field-Marshal French, and Lord Kitchener was nominated Secretary of State for War. In the latter England found an organizer far-sighted and strong-willed, the stamp of whose personality had made itself felt throughout the Empire in India, South Africa, Australia, New Zealand, and Egypt, and who was to prove the most formidable of all Germany's enemies. He found his country in a position to fulfil its immediate engagements towards France, involving the despatch to Europe of six divisions, to be followed by one or two others; but he alone realized the necessity, if the British Empire were to fulfil its gigantic task, of transforming it into a military power of the first rank. In order to provide an army of the necessary dimensions he planned to raise 70 divisions, which should attain their maximum strength in the third year of war, when the enemy's man power would be declining. "Kitchener thought in millions, where others thought in thousands," and he alone realized and said that England must be prepared to fight to the death.

It was decided to send over to France at first only one cavalry and four infantry divisions (about 100,000 men). At a conference held in London between representatives of the British and French Higher Commands it was resolved, after various conflicting views had been expressed, that this force should be assembled where both Joffre and French desired it to be, on the French left wing, between Maubeuge and Le Cateau. Before his departure French received instructions from the British Government which enjoined that, in view of the small numbers at his disposal, he was at all costs to avoid unnecessary losses and exposure of his troops; that he was only to undertake far-reaching operations after inquiring the views of his Government; and that he was to be absolutely independent; and in no circumstances to come under the orders of any Allied General.

All the measures for the transport and landing of the British Army in France had been carefully prepared in peace time; most of the transports sailed from Southampton to Havre, a few only going to Rouen and Boulogne. From these ports the troops moved by train to Le Cateau. The first ships sailed on 9th August, and the operation was completed by the 18th. It had in the meantime been decided to send over an additional division—the 4th—the disembarkation of which was completed on the 23rd. As the British Fleet had not yet secured command of the sea, the safety of the transports was provided for by the blocking of both ends of the Channel during the operation with light forces, the Grand Fleet remaining at sea to deal with the German High Sea Fleet if it came out.

French reached his headquarters at Le Cateau on 17th August. His Army consisted of the Ist Corps (1st and 2nd Divisions), under Douglas Haig; the IInd Corps (3rd and 5th Divisions), under Grierson, succeeded on his death by Smith-Dorrien; and the Cavalry Division under Allenby. The IIIrd Corps was formed later from the 4th Division and the 19th Brigade. The concentration south of Maubeuge was completed on the 20th. The task assigned to the British by Joffre was to advance north of the Sambre towards Soignies. At this time the Belgians had fallen back to Antwerp, the French Cavalry Corps had been drawn back from north of the Sambre to the British left flank,[1] and some French Territorial Divisions were dispersed over a wide front from Valenciennes by Lille to Dunkirk. In answer to Kitchener's repeatedly-expressed fears as to the possibility of an enveloping movement against the Allied left, French responded that Joffre and his Staff seemed confident and undisturbed, and were preparing to advance to attack the enemy. On 21st and 22nd August the British Army moved forward by way of Maubeuge to the region of Mons.

The Battle of Mons, 23rd August.

On 22nd August French believed that there were moving against his front three German corps, the westernmost of which was at Ath. In view of the menace of envelopment by the enemy, and the apparently unfavourable situation of the Fifth French Army on his right, the British Commander proposed to hold his ground for twenty-four hours only, and then withdraw towards Maubeuge.

On the morning of the 23rd, his IInd Corps stood behind the Canal between Condé and Obourg with its right drawn back to Villers—St. Ghislain. The Ist Corps was in echelon in rear of the right, with a cavalry brigade at Binche in touch with the French. The remainder of the cavalry were to the left of the IInd Corps.

The First German Army was at this time in considerable uncertainty as to the situation in its front. Its aviators, owing to mist and rain, were unable to carry out any observation of the area Avesnes—Le Cateau—Cambrai as ordered, and the IInd Cavalry Corps, which

[1] It did not reach the British left flank until the evening of the 25th August.

had been sent from Ath towards Courtrai, reported that at 6.30 a.m. they had been fired on from Tournai by strong hostile forces, detrained the previous day. It was not clear whether these forces were French or British, although the former was considered the more probable, but it was decided, until the situation became clearer, to halt the First Army north of the Leuze—Mons—Binche road, and orders to this effect were issued at 9.30 a.m.

On First Army Headquarters arriving at Soignies at 11.0 a.m. various reports were found that strong British forces, estimated at over 70,000 men, were moving northwards by Dour, Blaregnies, and Genly towards Mons, while the forces at Tournai, now known to be French, had retired towards Lille. The advance of the Army was therefore continued.

The IXth Corps came first into action about noon in the bend of the Canal between Vimy and Obourg, the IIIrd Corps was at 1.15 p.m. ordered forward by St. Ghislain—Jemappes, and the IVth Corps was directed on Thulin—Hensies to assist the IIIrd. The Canal crossings were to be occupied that evening. Owing to the distance of the IVth Reserve Corps from the battlefield, it appeared neither possible nor necessary to bring it up. The IVth Corps only came up very late. After heavy fighting along the Canal, and in the close country, cut up with ditches and wire fences, the IIIrd and IXth Corps reached the Canal from Condé to St. Ghislain and crossed it between Jemappes and Ste. Symphorien. The IInd and IVth Reserve Corps were well behind at La Hamaide (west of Lessines) and Bierghes (south-west of Hal).

First Army Headquarters considered that after the strong resistance the enemy had offered it would be necessary to renew the attack on the morrow in such a manner as to cut off the enemy's retreat to the west and drive him into Maubeuge. The advance was to be resumed at 5.0 a.m. The IIIrd Corps was to advance with its left west of Bavai, with the IVth Corps on its right, the IXth Corps to drive back the enemy on Maubeuge, and invest the north and north-west fronts of the fortress, while the IInd Corps was to make a night march to Condé. During the 23rd, G.H.Q. had ordered that the IXth Reserve Corps was to be left behind for the present to mask Antwerp, and a brigade of the IVth Reserve Corps was, however, detached to garrison Brussels. The IInd Cavalry Corps, which had hitherto been acting independently in the direction of Courtrai, now came under the orders of the First Army and was directed on Denain to assist the Army's right wing in cutting the enemy's line of retreat to the west.

When these orders had already been issued the IXth Corps reported that instructions had been received direct from the Second Army, which enjoined that it was to move at once west of Maubeuge in order to attack and envelop the left of the French forces with which that Army was then engaged. In view of the fact that it was itself in face of the enemy, the Corps replied that the execution of these instructions was not possible.

The First German Army on 24th and 25th August.

Early on the 24th officers were sent from Army Headquarters to all formations to ensure that the march was continued in a direction half-right from the line then held. The IInd Cavalry Corps was directed by way of Tournai, Orchies and Marchiennes on Denain, encountering and dispersing parts of the 82nd and the 88th French Territorial Divisions, which it reported had "arrived the previous day from Paris," and had taken position near Tournai and Orchies. Other similar units were known to be in the area out beyond the First Army's right flank. This long day's march on Denain was but one of the many great exertions demanded at this period of the Cavalry Corps.

The British continued their retirement the whole day, delaying the German advance by means of strong rear-guards, so that by the evening the heads of their pursuing columns had only reached the line Maulde—Condé—Onnaing—Givry south of the Canal. The location of the British main body was uncertain. The First Army appreciation on the evening of the 24th was as follows: "We have thrown back two or three British Divisions to-day towards the line Curgies—Bavai. Enemy's main position probably on line Bavai—Valenciennes. First Army will attack and envelop left flank of this line on 25th; IInd Cavalry Corps moves against hostile rear." It was believed that the enemy's main body would be encountered still farther to the south.

Orders for the 25th, issued at 8.30 p.m. on the 24th, were for the IXth Corps to mask Maubeuge, the IIIrd and IVth to advance against the line Valenciennes—Bavai, and the IInd to pass through the Forest of Raismes to envelop the British left, while the IVth Reserve Corps, in rear of the Army's right, advanced to Condé.

Information as to the enemy up to the morning of the 25th tended, however, to show that the British forces, believed to number four infantry and one cavalry divisions, were retiring in the direction of Bavai and Maubeuge from north, north-west, and west. Accordingly at 8.15 a.m. on the 25th further orders were hastily got out, which directed the IInd, IVth and IIIrd Corps to change direction towards the line Le Cateau—Landrecies—Aulnoye, with the IInd Cavalry Corps on the right of the army moving towards Guise. The general idea was to cut off the hostile retreat to the south and throw the British back against the French left wing.

At noon, however, further reports showed that contrary to expectations the enemy were moving in force from Bavai in the direction of Le Cateau, and were passing the Solesmes brook and heading south-westwards—a direction absolutely the opposite to that reported in the morning. It was necessary to take instant measures to block his retirement, and to attack and delay him wherever possible. The Cavalry Corps was directed to head off these hostile columns, while the IVth Corps pushed forward with its right on Solesmes—Le Cateau, the IInd Corps west of this line, the IIIrd Corps on the left of the IVth, bringing the weight of its force to bear towards its right flank, the

IXth Corps being still left in rear of the Army's left to observe Maubeuge.

During the course of the day the IVth Corps was heavily engaged in the Solesmes—Landrecies area, while the Cavalry Corps drove out French Territorial troops from Bouchain. The Army halted after a forced march on the line Bouchain—Solesmes—Landrecies—Aulnoye.

Owing to the late arrival of Army Headquarters at Solesmes it was not found possible to get out orders for the next day much before midnight. It was intended to continue the pursuit with all possible energy, beyond the line Cambrai—Le Cateau towards the south-west. The IVth Reserve Corps was brought up into the forward line. The portions of the IXth Corps not engaged in masking the south and south-west front of Maubeuge were to follow the IIIrd Corps to Landrecies.

The troops moved off early on the 26th as ordered, and at 10 a.m. there came in a report from the 9th Cavalry Division: "Cavalry Corps heavily engaged near Solesmes and Le Cateau; enemy attacking and advancing in places. Support requested." The battle of Le Cateau had begun.

The British from 23rd August to 26th August.

As a result of the attack on the 23rd, the British IInd Corps was forced at the end of the day to retire from Mons and the Canal salient and to withdraw its left after dark from the Canal line to a rearward position. Although there seemed no imminent danger of envelopment, information was received in the evening from Joffre that in addition to the three hostile corps and two cavalry divisions which had attacked frontally, a turning movement was in progress from the direction of Tournai. The British Commander resolved therefore to withdraw to the line Maubeuge—Jenlain, previously reconnoitred for defence. The Ist Corps at Givry covered the IInd Corps retirement to Bavai;[1] Allenby's cavalry, with the 19th Infantry Brigade, screened the left flank. After some pressure, the British reached the line La Longueville—Bavai—Jenlain on the evening of the 24th. On this day French asked General Sordet, in command of the Ist French Cavalry Corps, to move to cover his left, but owing to the exhaustion of his horses the latter was unable to comply for twenty-four hours. Meanwhile, the 4th British Division had begun to detrain at Le Cateau.

French, rightly believing that the Germans desired nothing better than to pin him up against the fortress of Maubeuge, resolved to continue his retreat, and before dawn on the 25th his army was on the move—the Ist Corps to the east, the IInd to the west of Mormal Forest. Fighting occurred at Solesmes and Landrecies, the Ist British and IVth German Corps contesting the latter place far into the night. The exertions and privations of their continued retreat were already beginning to be felt by the British.

[1] So stated by Lord French in his "1914," but not correct.

The French Troops on the Left of the British.

Between Dunkirk and Maubeuge there stood at this time the French 81st, 82nd and 84th Territorial Divisions, later reinforced by the 88th from Paris. Owing to the smallness of its numbers, less than 60,000 men, exclusive of the 40,000 in garrison at Lille and Maubeuge, this contingent, under General d'Amade, was in no position seriously to menace the First German Army's flank or to do more than secure the country against cavalry and armoured car incursions. On the 23rd the divisions stood as follows: 84th at Valenciennes, 82nd around Lille, 81st near Dunkirk, 88th detraining south of Lille. Parts of the 82nd and 88th were dispersed on the 23rd and 24th near Tournai and Orchies by the IInd Cavalry Corps, and parts of the 84th repulsed from Condé towards Cambrai on the 24th and 25th by the IInd and the Cavalry Corps.

Review of the German and British Operations from Mons to Le Cateau.

Had the original plan of the First Army for an advance with its left towards Mons—Bavai been carried out on 23rd August in place of the Army drawing in towards the Second Army and directing its left on Maubeuge, the British Army would have been struck in flank and rear instead of being assailed frontally in its strong position behind the Canal, and its envelopment by the German IInd Corps and cavalry, so much feared by French, might have been possible the same day. On 24th August little progress could be made by the Germans in face of the hostile rear-guards, though the enemy's positions were correctly estimated and the lines of pursuit well chosen. The first change of direction on the 25th towards the Le Cateau—Aulnoye line was injudicious, and would, if persisted in, have led to another frontal attack with the Army's right, while its left could have exercised no effective action. The erroneous aeroplane reports of a British retirement on Maubeuge were, in any case, unlikely to be true, and had the Army continued its former direction for the time being, an envelopment of the British around Maubeuge, if later proved necessary, would have been all the more effective. Fortunately there was still time, on the receipt of the later and more correct news, for the Army to resume its south-westward advance, although the double change of direction imposed, of course, considerable additional exertion on the troops.

The fortress of Maubeuge exercised no influence on the operations beyond affording some security to the British right. Both sides, despite all the modern means of information at their disposal, suffered from the fog of war. The French cavalry were worn out, the British stuck too closely to their infantry, the Germans were not in the right place. French seems to have depended for his news about the enemy on Joffre's reports.

It has been averred that at Mons Von Kluck had no clear battle plan, but threw his troops into the fight as they came up, though half

his forces could not be available for action before the evening of the 23rd. Instead of relying for the envelopment of the enemy on troops still far from the battlefield, he might well have waited till all his forces were assembled in the hope of surprising and overwhelming the British. Had he done so, however, it is probable that French would have received warning of his danger, even before the arrival at 5.0 p.m. of Joffre's report of the forces in his front, and resolved upon an instant retreat. According to the view of the situation held by him on the 23rd, Von Kluck had no other possible choice but to attack and pin down the enemy, as soon as he was encountered.

The Battle of Le Cateau, 26th August.

On the evening of the 25th the British Ist Corps reached Landrecies; the IInd Corps was assembled late at night at Le Cateau; G.H.Q. moved to St. Quentin. In view of his exposed left, and the danger to his communications with Havre, his base, and the lack of time to prepare a defensive position, French resolved to continue his retreat behind the Oise and Somme in the direction St. Quentin—Noyon, and there to rest and refit. On the 26th accordingly the Ist Corps fell back from Landrecies to Guise. The IInd Corps, however, with the 4th Division and the cavalry remained at Le Cateau, General Smith-Dorrien having decided, in view of the exhaustion of his men and the nearness of the enemy, to offer battle. On his left the 84th French Territorial Division held Cambrai. French, on hearing that fighting had begun at Le Cateau early on the 26th, sent a Staff Officer with orders for the action to be broken off and the retreat continued,[1] but only later in the day did he realize the true position.

Von der Marwitz' cavalry first came into contact with the British left and there fought to pin down the enemy until the arrival of the IVth Reserve and IInd Corps. The IVth Corps, moving on Caudry and Reumont, came into action about 9.0 a.m. It was intended that the IVth Reserve and IIIrd Corps should strike in on the hostile flanks, but this scheme was not carried out. The IVth Reserve Corps, after a long march from Valenciennes, only got into action near Esnes and Haucourt shortly before dark;[2] and in the night the enemy withdrew.[3] The IIIrd Corps only got as far as Honnechy. The IInd Corps drove the French from Cambrai. Thus the brunt of the action fell on the IVth Corps. General von Lochow, commanding the IIIrd Corps, arrived on the field in the afternoon[4] and promised the IVth Corps commander, Sixt von Armin, his support; but rightly considered this could best be given, not directly, but by continuing his march to his appointed objective. The IIIrd Corps, which on the 25th had been switched off

[1] Not the case.

[2] This is false. By the account of Captain Wirth, on staff of the 7th Reserve Division, and British records, it came into action about 2.0 p.m. (British time), its guns preceding it. Its march from Valenciennes was under 18 miles.

[3] Withdrawal commenced about 3.0 p.m., not in the night. See below, where Kuhl contradicts himself, and says the retirement was "by day."

[4] *Nachmittags*. This means any time after 11.0 a.m. (British time).

south-eastwards to Aulnoye, and on the 26th had been directed south-westwards on Landrecies, had had to move both its divisions in one long column, one behind the other; hence, the march of approach and the deployment took up so much time that it could only come late[1] into action on the left wing of the army.

On the British side there stood on this morning the main body of the cavalry on the right wing from the Sambre to Le Cateau, the 5th Division thence to Troisvilles, and with it the 19th Brigade, the 3rd Division near Caudry, and the 4th Division and a cavalry brigade near Haucourt. The British admit that Smith-Dorrien's position at midday was critical, as the retirement of the Ist Corps had exposed his right flank; he resolved therefore to order a withdrawal in the midst of the battle, at a moment when the 5th Division was being violently attacked. Considerable confusion ensued, and it seems that Smith-Dorrien suffered a severe defeat.

The troops fell back by St. Quentin to Ham, arriving there on the 28th, after a continuous march, covered by the cavalry. French gives the losses at 15,000 men, 80 guns, and much material,[2] while the condition of the army was so bad as to render unthinkable any stand behind the Somme—Oise line or even north of the Marne. A retreat to the line La Fère—Noyon was ordered on the evening of the 26th, and on the evening of the 28th the Ist Corps stood south of La Fère between St. Gobain Forest and the Oise, and the IInd Corps near Noyon.

On the French side the 84th Territorial Division, as also Sordet's Cavalry Corps, which had crossed behind the British front to their left flank, were both in action near Cambrai on the 26th and fell back thence to Péronne. The 61st and 62nd Reserve Divisions from Paris, detraining at Arras on the 25th, also moved thence by Bapaume southwards, but were encountered and defeated near Combles on the 27th and 28th by the German IInd Corps; the 61st was reassembled round Bapaume, Arras and St. Pol, the 62nd retired by Amiens to Pontoise (north-west of Paris). Both later rejoined the garrison of Paris, while the Territorial Divisions fell back by Abbeville behind the Lower Somme.

Remarks.

Despite much controversy it seems that General Smith-Dorrien was not justified in standing to fight at Le Cateau, as he was compelled in the end to effect his retirement by day in the midst of an action, and to demand from his men far greater marching exertions than if he had withdrawn earlier, before daylight, under cover of strong rear-guards. His action might well have exposed him to annihilation had the full force of the German First Army been available on the battlefield. One cannot refuse to recognize the bold attitude of the British troops who succeeded, even at the price of heavy losses, in carrying out their withdrawal in the middle of the fight. The British higher leading made

[1] A portion took part, at any rate, in the 11.0 a.m. attack, *vide* Oberleutnant Dr. Lohrisch's "In Siegessturm."

[2] These are the losses for the whole month of August.

itself little felt and allowed one corps to march off while the other was engaged in an unequal struggle; French, who was at St. Quentin, only heard in the evening of the fate of the IInd Corps. The battle had therefore ended in a severe defeat but not an annihilation of the British, and no further serious action took place against them till the Marne. It was believed by the First Army on the evening of the 26th that the whole of the British Army (six infantry and one cavalry divisions), and three French Territorial Divisions had been encountered that day.[1]

Arrangements were now taken in hand for attacking Maubeuge. It was finally arranged that two divisions of the Second and one of the First Army should be left behind for that purpose, and the IXth Corps was ordered to detach one. The First Army stood on this evening, the 26th, on the line Hermies—Crevecœur—Caudry—Honnechy. Except on the right wing no pursuit of the retiring enemy had taken place.

It is of interest to remark here, in view of the contention that modern war has no further use for permanent fortifications, that the French and Belgian fortresses during the course of this campaign caused the Germans considerable trouble. The capture of Liège was an essential preliminary to the advance of the German right wing. The IIIrd Reserve Corps had to be left behind to mask Antwerp. The siege of Namur absorbed two corps from the Second and Third Armies; that of Givet another division of the Third Army; and now that of Maubeuge three divisions of the First and Second Armies. Laon and La Fère, not to mention Paris, still remained to be dealt with. The capture of these places was essential to the smooth working of the German supply services, and no second or third-line troops were available to deal with them. Finally, the existence of the French fortresses of the eastern frontier conditioned the whole German plan of campaign, and left them no alternative to the advance through Belgium.

The British Retreat Behind the Marne, and Kitchener's Intervention, 28th August—3rd September.

The British, on 28th August, had retired to the line south of La Fère—Noyon, and rested in these positions on the 29th, as the First German Army, moving with its left from Le Cateau to north of St. Quentin, was no longer in contact with them. The First Army has been blamed for not having followed up the English vigorously after the battle of Le Cateau; had it succeeded, as it might well have done, in cutting off the British retreat to Paris, it must have prevented the French from utilizing the railways passing through the capital, and severed Maunoury's and d'Amade's forces on the Somme from the main body of the French Army. Von Kluck's idea, however, was that the English would probably fall back to the south-west towards their base, and in any case to follow them up in their retreat to the south would have had the double disadvantage of bringing the First Army into the zone allotted to the Second, and of leaving powerful hostile forces to assemble undisturbed on the flank of the German advance.

[1] Actually three British divisions and one French Territorial division.

The state of the British troops on 28th August, as is admitted by all witnesses, was such that it was before all things necessary to obtain a respite for rest and refitment.[1] Reinforcements to fill up the depleted ranks had not yet arrived, so that French considered himself to have no choice but to continue the retreat on the 30th in the direction of Compiègne—Soissons, and stated as much in a conversation with Joffre, who was compelled to concur in this decision and to confine himself to urging that the British should still remain in line so as to fill the interval between the French Fifth and Sixth Armies. This French agreed to do, although Smith-Dorrien at a conference on the same day had informed him that the condition of the troops rendered it necessary to retire to the coast and re-embark the army.[2]

As the British communications with Havre were now threatened by the German advance, the base was transferred to St. Nazaire and Nantes, with advanced base at Le Mans. The line of communications to Boulogne and Calais, which was no longer safe after the battle of Mons, had been closed down on 24th August, and it had been suggested then that the base should be moved to Cherbourg, but it was only on the 29th that French would agree to its removal from Havre.

The British retirement was resumed on 30th August. The whole French Army was at this time falling back to the general line Clermont —Compiègne—La Fère—Rethel, and Joffre expected that the British would fill the gap between Compiègne and La Fère. That it was intended to accept battle on this line is not certain, though Count Schlieffen had in his original plans prepared for such an eventuality and devised to deal with it a frontal attack on the Oise line between La Fère and Paris, and an enveloping movement to the west and south of the capital. In any case French adhered to his decision that he was in no position to fight at present, and could only promise to withdraw slowly so as to hold his position in the line between the Fifth and Sixth Armies. On the 31st the British passed to the south of the Aisne to the area Néry—Crepy-en-Valois—Villers Cotterets. Joffre once more urgently requested that they should halt and renew the struggle, only to meet with a second refusal. The Field-Marshal used the continued retirement of the Fifth Army on his right, and of the Sixth on his left —a retirement itself caused, according to the French, by the precipitate retreat of the British—as a pretext for refusing to halt before he had received men, munitions and supplies to replace his losses. It must be admitted, however, that had they stood to fight on 1st September, the British would soon have found themselves outflanked by the German First Army.

Indeed, at this date French, as we knew from his correspondence with Lord Kitchener, wished to retire behind the line of the Seine. He stated in a wire of 31st August that "he had resolved to-morrow to commence a retreat behind the Seine in a south-westerly direction, west of Paris. This involved about eight marches out of reach of the enemy." He did not, however, intend a prolonged retreat. A letter

[1] This is a mere legend, as after events proved.
[2] This has been denied by General Sir H. Smith-Dorrien.

sent off on the 30th painted the picture, as seen by the Field-Marshal, in yet darker colours. He no longer regarded the future prospects of the campaign with confidence, and his trust in the French leadership was rapidly melting away. Hence his decision to go so far back, and his desire "to be in a position to retire to his base if circumstances made it necessary."

Kitchener, fully aware of the disastrous political consequences of a withdrawal of the British forces from the battle-line at a moment when Paris itself was in danger, placed the matter before the British Government, and meanwhile wired to French expressing his surprise at the new decision, and emphasizing the possible effects on the French Army and the general military situation, if a gap were left in the Allied line by the withdrawal of his forces behind the Seine. The Government concurred in Kitchener's views as to the seriousness of the peril, and in his wire to French of 31st August, which expressed the fear lest such a movement as was proposed might forbid close co-operation with the French, and the expectation of the Government that the British Commander would, as far as possible, fall in with Joffre's views as to the conduct of operations.

The Field-Marshal's answer arrived at midnight. The French retreat was still going on, and the condition of the British was such that they could hardly at present hold their ground against a resolute attack by a single German corps. "I cannot see," it ran, "why I should be called upon to run the risk of annihilation in order to save the French a second time."

Kitchener at once crossed over to Paris, and in the afternoon of 1st September met the Field-Marshal, the French Premier Viviani, and the War Minister Millerand at the British Embassy. The position had meanwhile improved; the German First Army was no longer pressing the French Sixth Army and the British, who were thus allowed a short breathing space. French expressed himself as ready to comply with the requests made to him, and it was arranged that his troops should remain in the fighting line in conjunction with the movements of the French Army, taking care to avoid being in any way menaced on their flanks.

In view of the above facts there is no contesting the hopeless outlook held by the British Commander, or the shattered state of his troops. Both must be attributed to the vigour and relentlessness of the German First Army's operations, the success of which was greater than had been believed at the time. The British losses from Mons to the Marne amounted to close on 20,000 men, and only Kitchener's intervention prevented their complete withdrawal from the fighting zone. The First Army was to prove correct in its supposition that French in the battle of the Marne would not easily pass at a moment's notice from a long retreat to a resolute offensive.

On 1st September the British, after rear-guard actions at Néry, Verberie, and Villers Cotterets, reached the area La Ferté Milon—Betz—Nanteuil le Haudouin. Next day they reached the Marne at Lagny and Meaux, and crossed to the south bank on the 3rd.

THE BRITISH SHARE IN THE BATTLE OF THE MARNE, 1914.

Extracted from LIEUT.-COLONEL MÜLLER-LOEBRITZ' "The Turning Point of the World War."

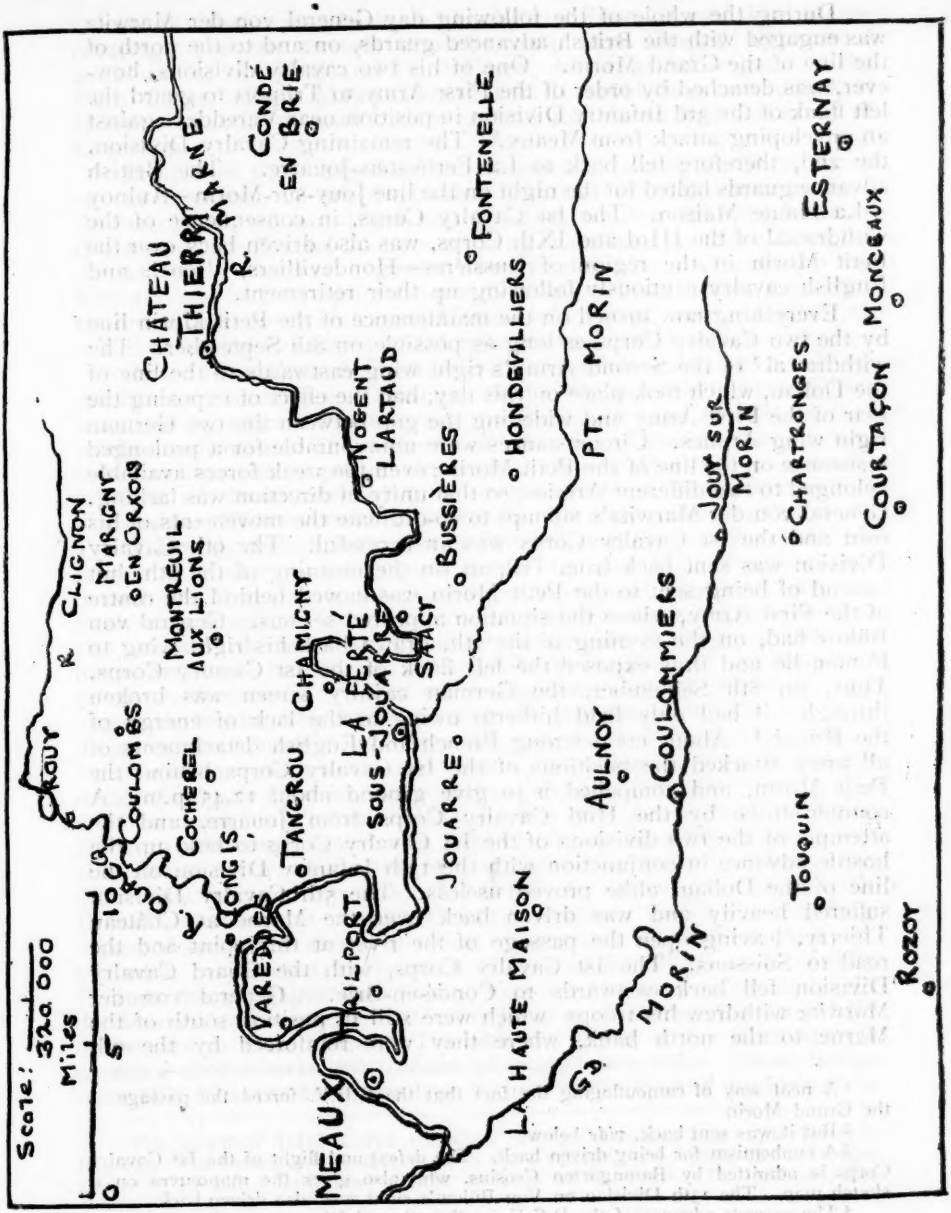
THE reasons for the retreat of the First German Army on 9th September, 1914, are not to be found in the course of events on the Ourcq battlefield. We must therefore describe what took place in the rear of that army. Since 6th September, General von Kluck had been operating on interior lines, so that while massing his troops against the enemy forces north of the Marne, he was bound to facilitate the task of those to the south of that river. Should these latter succeed in pushing forward in sufficient strength to co-operate effectively in the main battle on the Ourcq, the First Army would lose the advantage of its interior lines, and could scarcely hope to escape envelopment and defeat.

General von Kluck, relying on the British slowness, which had been so manifest during the first few weeks of the campaign, and on the shattered condition of the French Army, had left only the bare minimum of troops south of the Marne, and drawn off all the rest of his army to the Ourcq battlefield. On 6th September, when the German withdrawal to the north commenced, there was thus left facing the three British Army Corps only the IInd Cavalry Corps (48 squadrons, 4 Jäger battalions, and 6 batteries). The rear-guards of the IInd and IVth Corps were withdrawn from their positions on the Grand Morin before they could take any part in the action.[1] General von der Marwitz succeeded by partial attacks towards Rozoy and Touquin in holding the British in check all day.[2] Field-Marshal French, though he realized about noon that the right wing of the First Army was falling back to the north, did not succeed in expediting his advance, at any rate on this day; also the French IInd Cavalry Corps was held up south of Courtaçon by the advance of the weak Ist German Cavalry Corps.[3] General von der Marwitz bivouacked on the night of 6th Sept. south of the Grand Morin around Coulommiers, General von Richthofen (Ist Cavalry Corps) in the area Courtaçon-Chartronges. The left wing of the Fifth French Army, which Joffre had intended should deliver the decisive attack, had been checked by the German IIIrd and IXth Corps on the line Monceaux—Esternay.

1 Hardly the case; both Corps were identified by contact on the 6th.

2 Hardly the case. The average advance of the B.E.F. on the 6th September was over 12 miles.

3 Weak only because it had two divisions, while the IInd had three.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CHATEAU THIERRY
R. MARNE
CONDE EN BRIE
FONTENELLE
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COURTAÇON
MONCEAUX
CHARTRONGES
JOUY SUR MORIN
NOGENT L'ARTAUD
BUSSIÈRES
LA FERTÉ SOUS-JOUARRE
SAACY
CHAMIGNY
JOUARRE
TANCROU
CHAILPORT
VAREDDES
LONGIS
COCHEREL
COULOMBS
CROUY
R. CLIGNON
MARIGNY EN ORXOIS
MONTREUIL AUX LIONS
MEAUX
LA HAUTE MAISON
AULNOY
COULOMMIERS
TOUQUIN
ROZOY
R. MORIN

During the whole of the following day General von der Marwitz was engaged with the British advanced guards, on and to the north of the line of the Grand Morin.[1] One of his two cavalry divisions, however, was detached by order of the First Army to Trilport to guard the left flank of the 3rd Infantry Division in position near Vareddes against an enveloping attack from Meaux.[2] The remaining Cavalry Division, the 2nd, therefore fell back to La Ferté-sous-Jouarre. The British advance guards halted for the night on the line Jouy-sur-Morin—Aulnoy—La Haute Maison. The Ist Cavalry Corps, in consequence of the withdrawal of the IIIrd and IXth Corps, was also driven back over the Petit Morin in the region of Bussiéres—Hondevilliers, French and English cavalry cautiously following up their retirement.

Everything now turned on the maintenance of the Petit Morin line by the two Cavalry Corps as long as possible on 8th September. The withdrawal[3] of the Second Army's right wing eastwards to the line of the Dollau, which took place on this day, had the effect of exposing the rear of the First Army and widening the gap between the two German right wing Armies. Circumstances were unfavourable for a prolonged resistance on the line of the Petit Morin; even the weak forces available belonged to two different Armies, so that unity of direction was lacking. General von der Marwitz's attempt to co-ordinate the movements of his own and the Ist Cavalry Corps was unsuccessful. The 9th Cavalry Division was sent back from Trilport on the morning of the 8th, but instead of being sent to the Petit Morin was moved behind the centre of the First Army, where the situation appeared serious. General von Bülow had, on the evening of the 7th, drawn back his right wing to Fontenelle and thus exposed the left flank of the Ist Cavalry Corps. Thus, on 8th September, the German cavalry screen was broken through: it had only held hitherto owing to the lack of energy of the British.[4] About noon strong French and English detachments of all arms attacked the positions of the Ist Cavalry Corps behind the Petit Morin, and compelled it to give ground about 12.45 p.m. A counter-stroke by the IInd Cavalry Corps from Jouarre, and the attempts of the two divisions of the Ist Cavalry Corps to hold up the hostile advance in conjunction with the 13th Infantry Division on the line of the Dollau, alike proved useless. The 5th Cavalry Division suffered heavily and was driven back over the Marne at Château Thierry, leaving open the passage of the river at this point and the road to Soissons. The Ist Cavalry Corps, with the Guard Cavalry Division fell back eastwards to Condé-en-Brie. General von der Marwitz withdrew his troops which were still in position south of the Marne to the north bank, where they were reinforced by the 9th

[1] A neat way of camouflaging the fact that the B.E.F. forced the passage of the Grand Morin.

[2] But it was sent back, *vide* below.

[3] A euphemism for being driven back. The defeat and flight of the Ist Cavalry Corps is admitted by Baumgarten Crosius. who also gives the manœuvre on a sketch map. The 13th Division on Von Bülow's right was also driven back.

[4] The average advance of the B.E.F. on the 7th and 8th was 10 miles each day.

Cavalry Division sent back to him by the First Army. The Marne crossings between Congis and Tancrou were secured by several battalions of the IInd and IIIrd Corps, and a mixed brigade of the IXth Corps, under Major-General von Kraewel, was assembled at Montreuil-aux-Lions with orders to hold the Marne line eastwards of Chamigny.

In spite of these measures the situation in rear of the First Army on the afternoon of 8th September was an extremely anxious one. Between Montreuil-aux-Lions and Margny, whither the 13th Infantry Division of the Second Army was being withdrawn on the evening of the 8th, there stretched a gap of over twenty miles. However, if the British could be held up for twenty-four hours on the Marne a decisive victory would be gained over Maunoury's Army, and the situation would be entirely changed to the advantage of the Germans.

General von Kraewel considered that his main task, that of holding the Marne line between Chamigny and Château Thierry, could best be solved by vigorously attacking the British as soon as they set foot on the north bank. The difficulty of bringing up the exhausted troops to secure the crossing points, many of which were far distant, especially in view of the absence of good maps, rendered any other course impossible. Events proved, however, that the project adopted by Von Kraewel, though theoretically justified, was in reality beyond his powers. Early on 9th September the Ist and IInd British Corps passed the Marne unopposed between Saacy and Nogent L'Artaud. Each of their columns largely outnumbered Kraewel's brigade, so that any attack by the latter would have exposed both its flanks to envelopment, and must have led to its annihilation. General von Kraewel, therefore, determined to stand on the defensive around Montreuil, and was so far favoured by fortune that the British did not venture far from their points of passage, and thus let slip the opportunity of pushing vigorously forward into the rear of the First Army. Only the British cavalry and 5th Division attempted to advance, and the former withdrew at once to Château Thierry when the 5th German Cavalry Division advanced against its flank from Marigny-en-Orxois. The 5th British Division advanced against Kraewel's Brigade; the action that followed was conducted mainly by artillery, and Kraewel's Brigade, assisted by the 9th Cavalry Division, and by the leading troops of the 5th Prussian Division, despatched by the First Army to Cocherel, maintained its position till nightfall. West of Kraewel's Brigade the 4th Jäger Battalion of Von der Marwitz's command held the Marne crossing at La Ferté-sous-Jouarre all day against the whole of the British IIIrd Corps.[1] The rear and flanks of the First Army's covering troops were still secure when darkness fell.[2] These troops were able to extricate themselves without difficulty and prolonged in

[1] The so-called IIIrd Corps contained the 4th Division and 19th Infantry Brigade. The Germans were driven off in the afternoon, and repairs on the bridges began at 4.0 p.m. Only one brigade attacked at La Ferté. The author omits mention of artillery. "All day" is not correct.

[2] But they had failed to hold the Marne.

the direction of Marigny-en-Orxois the line Crouy—Coulombs held by portions of the First Army. Eventually they withdrew behind the Clignon, where they were joined by the remainder of the army falling back from the west bank of the Ourcq. The leaders, who were entrusted with the security of the flank and rear of the First Army, still had, on the evening of 9th September, full confidence in their own ability to cope with the situation, so that it cannot be maintained, as General von Bülow has asserted in his published report, that the position of the First Army on this evening rendered its immediate retreat inevitable.[1]

[1] Von Kuhl, Von Kluck's Chief of Staff, thinks differently. He says, "Even a victory over Maunoury could not prevent us from having our left flank enveloped by superior force, and from our being forced away from the main armies." Kuhl's "Marne," p. 219.

THE MARNE, 1918.

Translated from "Das Marne-Drama, Juli 15, 1918."

By Von Kurt Hesse, Oberleutnant im Grenadier Regiment No. 5.

"*TO-MORROW we are going on to Paris,*" we said laughingly to the Commander of the 3rd Battalion of the French Line Infantry Regiment No. 2, which had had to retreat to the Marne under the sharp pressure of our Grenadiers, and 800 men of which had surrendered on the evening of 30th May. "*No, Monsieur, to Paris? Never! Think of* 1914! *The Marne!*" The French lieutenant-colonel said this seriously and in a dignified manner. We respected his pride, and even became grave ourselves for a moment. But then our joy at the day's splendid success triumphed: the Marne was reached—from the Chemin des Dames across the Aisne and the Vesle to the legendary stream within four days. And scarcely any losses, whereas the enemy had suffered severely. Now on to Paris!

During the night of 30th May came the order from the 36th Infantry Division to hold the position gained. Disappointment ensued, but, of course, we were not able to see much to the right or left. And when the water-carriers went down to the Marne, early the next morning, they found themselves under well-aimed fire from the opposite shore. We had a new enemy in front of us, who no longer thought of retreating.

Between us was the Marne, a rapid stream, which, at Château Thierry, is about 60 to 80 metres broad, very deep and canalized. The heights to the right and left are covered with fine woods, orchards and vineyards; many villages; pastures filled with cattle. As I stood with my commander on the heights to the east of Château Thierry on the morning of 31st May, a paradise lay before me, over which the sun shone brightly, while a fresh wind blew through the valley. Nothing was to be seen of the enemy—hardly a man—during the next five weeks, though a shot fell now and then, when someone was careless in showing himself. We tried to let the artillery know what targets were to be fired on, but mostly without success.

We learned the details of the coming operation on 12th July, only a few days before the attack. In accordance with orders, reconnaissance was to be made only within narrowest limits. Only regimental and battalion commanders and a very few company commanders were allowed to inspect the first and second points of assembly, lines of approach, battle headquarters, positions for vehicles, and similar spots

which had to be examined. My unit—the Grenadier Regiment No. 5—was to cross the river on the right flank of the 36th Infantry Division at two points near Jaulgonne, to the right the 10th Infantry Division, our fellow combatants of 21st March and 27th May during the first days of the offensives of St. Quentin and Chemin des Dames, and to our left Infantry Regiment No. 175. The infantry and machine guns were to go across on pontoons and later on ferries; the artillery and vehicles were to follow on bridges.

We practised embarking, disembarking, and crossing with several pontoons on the Ourcq near Fismes. In order to carry out this peace training the infantry had to march 18 kilometres each way in the blazing sun, and through the dust which lay deep along the roads leading through the woods from Fère-en-Tardenois. They returned to their quarters, completely worn out, only to be routed out again during the night by the bombardment. And this only a few days before the attack!

The actual order for the operation was given very late. I was occupied in working it out when a grenadier, who was an utter stranger to me, presented himself. In an agitated but respectful manner he asked me whether it was true that Americans were facing us and that the plan of attack had been betrayed. I quieted him, but inquired carefully what the men thought of the attack. They all had full confidence in their leaders, but had, nevertheless, a vague feeling that things might not turn out well. The old soldiers of the front always used to say: "The infantry has instinct."

Whoever had clear judgment must have foreseen a failure. The enemy had more than once taken our men prisoners, and had, among others, caught a flash-ranging officer who, contrary to orders, had important maps with him. Deserters from our ranks were reported here and there. Contrary to all military experience, very little was done to keep our intentions secret. For instance, although hostile aviators had been circling above us for more than four hours, the ammunition columns were still standing in compact lines on the roads at 9.0 a.m.

The enemy bombardment increased daily, and as we gathered at the assembly points on 13th July heavy gas-clouds hung in the woods of Jaulgonne. We consoled ourselves by saying: "It will be all right." The last offensive had encouraged us, though more the commanders than the troops. Was the front mistaken at that time, if it had the feeling that its warnings were not sufficiently heeded? It would, of course, have made a strange impression if faint-hearted voices had been heard in the division only a few days before an attack. And it was quite comprehensible that a General Staff Officer, who had exerted his entire energy and intelligence in the preparations for the attack and who looked forward to its success, should avoid saying: "It cannot be done!"

The two days which we spent sheltered in the woods, 5 kilometres from the Marne, passed off well. We suffered but little through bombardment. The weather was tolerable; to be sure, it rained somewhat,

but the infantry, which was completely without shelter, had already fared worse.

"Bombardment by our artillery commences on 15th July at 1.10 a.m.

"The artillery barrage will be advanced 300 metres at 3.40 a.m.

"The infantry will cross the river.

"The rolling barrage and the infantry attack will commence at 4.50 a.m."

With the exception of a few trifles, everything worked well. Some carrier pigeon bearers were missing, and the wireless detachment lost its way, but the main thing was—all detachments had received their orders.

Shortly after nightfall on 14th July the infantry advanced to the foremost points of assembly. They were opposite the enemy, 600 to 800 metres from the river, in the midst of the woods on the slopes of the hills leading to the Marne. Shelter (trenches or dug-outs) had not been provided; the only thing indicating the locality was signboards, which could not be seen at night. I have scarcely ever experienced a night as dark as that of 14th July. The men could not see a metre ahead, and ran into the trees. The ground was smooth and slippery, the air was filled with gas; now and then we heard a roaring sound—the enemy firing over some heavy shells.

Hour upon hour passed. The infantry, for whose advance of 4 kilometres two hours had been calculated, did not arrive. The commanders, who had been out there but once, and then in the daytime, required much more time to find their way than had been expected. Besides that, the exertions for the men were enormous. When they had finally reached their destination, the reports were not very satisfactory; losses while approaching; extreme exhaustion of the men; several men prostrated from marching, and others gone astray—but, at any rate, they were where they belonged!

At last a maddening artillery bombardment began. I looked at my watch: 1.0 a.m. Had our artillery made a mistake? It was not to commence until 1.10 a.m. We got out of the hole where we were sitting, and then got quickly in again. Shells were bursting before and behind us. The *enemy* had opened fire! Ten minutes later our artillery started firing, not shot upon shot, as had been ordered, but desultorily, and sometimes growing to powerful proportions, so that we had hopes that everything would still turn out all right. Then it grew weaker and weaker. At times the enemy fire was much more severe than our own.

The telephone lines to the front and the rear were soon destroyed. Still no report at 3.50 a.m. We are urged from the rear: "Send a report as to how things are! Has the infantry crossed the river?" The answer is returned: "As yet no report whatever, except heavy firing by the enemy; it is supposed that everything will go off as planned." Finally, at 4.30 a.m., news comes from the front positions: The Fusilier Battalion, the advanced attacking battalion on the left, reports that the point of assembly has been under very heavy enemy

fire, that two companies have been entirely routed, and that the success of the attack is seriously doubted. The text of the report is at once transmitted further. Whether or not the crossing has succeeded is not known as yet. The regimental staff despatches patrols to gather information on the situation. At last, after hours of waiting, a more detailed report is received.

The 1st Battalion, which was to attack on the right, has been completely decimated by enemy artillery fire in the small path leading down to the river. Only parts of it have arrived at the river. The engineers have failed. The pontoons have come to a dead stop a few hundred metres before the Marne; the passage here is impossible, as strong enemy infantry, with numerous machine guns, is tenaciously defending the other bank. To the left it looks a bit better. Two companies of the Fusilier Battalion have reached the river and are crossing it. The greater part of the 2nd Battalion, which was to follow as a reserve, and which has been led up very skilfully by Captain von Plehwe, the victor of 30th May, has already gained the opposite bank and is holding the railway embankment, about 600 metres to the south of the river. The losses of the Fusilier Battalion are heavy, those of the 2nd Battalion, 5th Regiment, smaller. The attack is at a standstill. A strong enemy prevents further advance.

This is the first scene. The infantry lying unprotected in the great forest of Jaulgonne, which a dense growth of underbrush renders impenetrable, but which, on the other hand, has scarcely a tree large enough to afford cover against infantry bullets. The massed enemy artillery fire strikes into these woods; not a spot is spared. The shells of one heavy battery are constantly falling here. The impact of the projectiles is fearful, nerve-racking. The clearing over there is grazed every five minutes by a light battery and has become a black crater within a short time. And the narrow lane to the right is being shelled by shrapnel, whose luminous course is like the tails of comets. The men are running hither and thither senselessly, looking for shelter. And again a roaring noise; the explosion sounds muffled—gas-shells! Put on gas-masks! Even before we could see only a little—now, nothing at all. At last a hoarse order from the company commander, still conscious of his duty: "Form ranks! Has everyone a rifle?" And now we advance over the narrow paths, into which shells are falling heavily, but which are the only ones leading down to the river. The engineers are standing at the lower end. Their leader is distracted; he has only a few men left. The infantrymen seize the pontoons in order to carry them themselves the few hundred metres to the river.

The escort artillery—each infantry regiment has one or two batteries, ours being one field battery and one mountain battery—comes up. One gun has been demolished by a direct hit, the shaft of a second broken. The gunners ask: "Is there any use going on?" They receive orders to stop and look for a place where they will be, as far as possible, out of range of the fire. But the mountain battery has already gone into the narrow path through which the 1st Battalion advanced, and is caught there; can drive neither to the right nor the

left, only forward. And one shot after another is hitting the splendid troops. The horses roll on the ground and the ammunition blows up.

Down at the stream the engineers work better with the Fusilier Battalion. Two pontoons are on hand; six were to have been. The first one crosses, overloaded. A machine gun opens fire from the other side; too high. Everybody ducks, throws himself down. Has our artillery had no effect at all? The bank is steep. The infantrymen pull themselves up by the willows; are caught—a wire entanglement! No one had ever seen it, nor had the telescope been able to discover it. Is a trench behind it? The men feel their way. It is still entirely dark. One of them steps upon something soft, which suddenly gives way, and then close combat is already upon us. The enemy is here in a section of trench and has been sheltering himself until now against our artillery fire. It takes a moment, then we have the upper hand. It is almost always the case in "sharp close combat" that fear of the cold steel seizes a man and he runs away.

We cross the river comparatively quickly. We look at our watches. "For heaven's sake, the barrage is already advancing!" "Form ranks!" New objectives are given the companies, since everything has turned out differently than was planned.

The railway is crossed, the station of Varennes taken after a short combat, across the Moulins-Varennes road—we are already 1,000 metres south of the Marne—and up the southern slope of the valley. Sharp firing and cries come from the right. In the early fog raiding parties in brown uniforms are seen advancing through the high cornfields—Americans! They stand still now and then and fire. Our soldiers run towards the rear. The situation is extremely critical. Where are our neighbours, the 6th Grenadiers? Their attack must have failed. Does the artillery see nothing? They are continuing their rolling fire "according to plan." That lasts until 11.0 a.m., and then they are ready for other tasks. But even then they probably would not have been able to accomplish them, because the observation of the battle is very difficult; the mist on the ground renders the view indistinct, the corn is high, movements are made invisible by the numerous small woods and orchards. The leaders of the 2nd and Fusilier Battalions, Captains von Plehwe and Eben, who are at the front of their companies, recognize that there is grave danger in delay. Everyone who knows how to shoot turns toward the right flank of the enemy. We must admit that he is tremendously courageous. Only after the hail of the machine guns and the desperate firing of the infantry have reaped a bloody harvest in his ranks does he come to a standstill and retreat. We feel relieved. But everyone realizes that our own attack has failed. We must see that we hold the positions gained with our weak forces, numerically inferior to the enemy.

The railway seems well adapted for defence. It is somewhat elevated and also affords shelter against fire, but on the other hand it is naturally a good target for the enemy's artillery. The units farthest advanced are methodically withdrawn to this point. The right flank,

which is exposed, is strongly protected. Connection with the neighbour on our left is established about 11.0 a.m. His advance was somewhat easier, but he is having a hard time fighting now. Strong elements of Grenadier Regiment No. 6, which had been placed on our right for the attack, crossed the stream, but then met a too-powerful enemy and were destroyed. Great numbers of the regiment are marching off as prisoners through the Surmelin Valley, through which we were to have made the attack. One of our companies—the 6th, under command of 2nd Lieutenant Oberg—which, strangely enough, had penetrated the enemy's lines, takes them to be advancing German troops, and goes forward 4 kilometres on the eastern slope of the Surmelin Valley, straight towards the enemy. Below, to the right, American infantry columns are marching; above, to the left, the enemy batteries are firing incessantly, until at last the small group is noticed. It is having a hard time now, but holds out courageously until evening. Its brave leader and a few men fight their way back in the night through the enemy's lines to another German unit and rejoin us. That was a bright spot, but the only one during this operation, and that is why I mention it.

On the afternoon of 15th July we succeeded in improving our line somewhat, as the enemy withdrew his a little, probably for fear of a double flanking movement. But that changed nothing in the final result of the day, which was the worst defeat of the War. It was only necessary to descend the northern slopes of the Marne Valley. I have never seen so many dead, never such fearful scenes of battle. The Americans had annihilated two entire companies of ours in close combat on the opposite bank. They had lain in the corn in a semicircle, had permitted them to approach, and then, at a distance of thirty to fifty paces shot down almost all of them. It must be admitted that this enemy had good nerves, but he also displayed a bestial brutality. "The Americans are killing everybody!" was the cry of horror on 15th July, which long remained in the memory of our men. But people at home scoffed at the insufficient training of the enemy, at the American "bluff," and at other things. That we left, in dead or wounded, on the battlefield, more than 60 per cent. of the troops which had been led into battle is chiefly due to the Americans.

Our hope that better results had been attained on the remainder of the broad front of attack proved to be wrong. It is true that the usual rumours went around—"Rheims is taken!" "The Bavarian Division on our left has advanced 15 kilometres!" But, as so often, there was unfortunately no truth in them. Everywhere the same scene: a splendidly courageous attack, very heavy losses, and no results worth mentioning. A long narrow bridgehead had been created on the Marne front, and it was but natural that heavy attacks against it were to be expected shortly. We prepared for them, but had little hope that we would be able to maintain our position very long. With the river only 1 to 2 kilometres behind us, things were not very hopeful. The first attacks came on 17th July. They were repulsed. On the 18th the enemy made a stronger attack and used tanks, but without success.

We greeted the order, "The front will be withdrawn behind the Marne!" as a deliverance. During the night of 18th July we moved off. The Marne bridges were under fire. One bridge was already destroyed, but we crossed it fairly easily. In any case, the enemy noticed nothing, so that the patrols which we had left on the southern bank were able to remain there for many hours and to return unmolested.

We hoped for rest. Such a day as 15th July tells upon the body and nerves for weeks afterwards. Our ranks were thinned and a depressed mood took hold of most of the men, for we had left so many comrades on the other side. Some of them we had not been able to lay to rest. Had it not sounded like a warning: "Your turn will come soon, too"? Such were the thoughts of the man at the front. Then the rumour reached us "things look bad to the right; an immensely strong enemy has attacked from the forest of Villers Cotterets and advanced 15 kilometres on the first day; we must retreat." We set our teeth, but believed it even before we officially learned the details. And to these troops, which had just endured such hardships, was assigned the task of giving their very lives in order to hold back the overpowering wave of assault. Quietly and patiently they carried that task out, sacrificed the rest of the veterans of 1914, and did *not* lose their honour.

When I inquire into a plan of attack I always investigate three principal points:—

Were point and time of attack of the operation properly chosen?
Were preparations sufficient?
Do execution and success fulfil the expectations?

I will not go into detail on the first question. The matter was thought over at that time; how can the attack be justified from a tactical viewpoint? Our thrust southward has already gone so far, the flanks are in such danger. And dare I attack if I have insufficient communication with the rear?

As regards the zone of attack assigned to my men, it might have been regarded from the outset as an unusually difficult one. The Marne, a most difficult obstruction to overcome, separates me from the enemy's foremost positions; I know next to nothing of my opponent. The forests on the southern slopes of the river may hold unpleasant surprises (especially regarding the strength of the enemy's artillery); Château Thierry is on our right flank and the enemy's front, extending from there southward, threatens our flank. The large forests are not unpropitious to us, for we can assemble there without being seen; but there are too few roads at the rear of the zone and not enough points suitable for bridging. All told, the field is more unfavourable than favourable.

The time? It was impossible to say at the beginning whether the proper day had been chosen. One had but to calculate exactly how much time was needed for the preparations, but usually a complete miscalculation was the result. Whether the insufficient communications with the rear (no direct railway in the bend of the Marne) had not been properly considered, or whether the acceleration in operations was

due to other causes, I am unable to judge; or whether they said: "The preparations must not take longer than four weeks, otherwise they cannot be kept secret." If the latter, their foundation for that statement was the worst conceivable one.

In any case, the hour chosen was wrong: the river was to be crossed in complete darkness. If the troops feared anything from the very first, it was the night attack, for it amounted almost to that in the end. We had had too bitter experiences with them during 1914, had suffered too heavy and fruitless losses. Ever since that time the man at the front dreaded such an operation. It was difficult to hold the men together at night, and if once scattered or separated while marching, how collect them again? It would have been better to set the infantry attack an hour later.

As for the preparations, they promised success only if it was assumed that—

(1) Our own intention was kept entirely secret, so that the enemy was not able to take counter-measures.

(2) All measures for execution of the operation were carefully considered and carried out without haste, such as assembly of artillery, provision of ammunition, reconnaissance and indication of targets, equipment and assembly of infantry, engineers, intelligence troops and medical units, air reconnaissance, distribution of columns, disposal of reinforcements, road-making service, and many others. The final result of all this should invariably have been the infantry attack meeting with almost no resistance from the enemy, and with almost no losses.

(3) The troops destined for the attack were feeling fresh and in full possession of their physical and moral powers, thus being able to give their best throughout several days.

If the Marne offensive be considered on the basis of these points, the conclusion is reached that grave errors were made.

I have already mentioned that it was known in Charleville as early as the beginning of July that an attack was to be made on the Marne. The blame for this rests principally on the higher staffs, which were not able to keep their knowledge to themselves. Too many clerks were initiated into the secret. The general staff officer was the commanding organ only, not the executive one. When the lives of tens of thousands were at stake, nobody should have been made a confidant who, under the pledge of secrecy, would forget his honour over a bottle of wine or for money. It was impossible, in view of the enormous preparations, to expect complete secrecy, but the details could have been concealed.

A great deal of blame rests with the front troops for betraying the intention to attack. They made the customary mistakes; in spite of all commands to the contrary the telephone lines were carelessly used, so that the enemy heard odd bits of information and could form a clear conception. To be sure, the use of the telephone was completely suppressed—of course, absolutely necessary tactical conversations had to go through—but it should have been more sharply watched by officers

than was the case, so that instruments which were under seal should not be generally used or orders disobeyed in other ways. If anyone protested against it the reply was: "I *must* do it." And if the conversations were: "Only 1,000 rounds were supplied to-day; if we do not receive 1,500 to-morrow, we shall not be ready," or "We need 10 kilometres more of cable for connecting the battalions, but we must have it to-day without fail!" An intelligent enemy then knew enough, and the one opposite us was a very sly one indeed. But we always underrated him. Especially after we had made two successful offensives and were on the eve of the Marne battle, remarks enough could be heard in the rear. The old assurance, "We shall finish France in four weeks," came up again. But the man of the front was laughed at, who said that an attack of 27th May (Chemin des Dames-Marne) was an exception.

The fact ought not to have been forgotten that some men, destitute of honour, had gone over to the enemy shortly before the attack. The surveillance at the front against such possibilities undoubtedly left much to be desired. But where were the troops to be had? The old rules of position warfare were again forgotten; no sentries alone, no single runners, no one without arms, no weak patrols against the enemy. Thus it was not difficult for the enemy to take prisoners, and these, for the most part, readily gave information. But it was unnecessary that a reconnoitring officer should fall into the hands of the enemy. Blame for this could be attached to no one except to the man concerned, who had been taken prisoner while in possession of important sketches. That was a crime.

And the carelessness must be just as sharply condemned which, precisely at the time of this attack, prevailed in regard to enemy observation. This was to be expected as a matter of course, both from the ground and from the air. It is true that traffic at the front was much restricted, yet the reconnaissances, which had to be made hurriedly, revealed a great many things. Maps were carelessly shown, and reconnoitring detachments moved about in broad daylight in positions exposed to observation. Besides this, the work connected with camouflage was often insufficiently done. For instance, a number of pontoons were left lying in full view, uncovered. Guns were left standing without any disguise. But the worst was that farther back, on the roads from the front to the artillery positions, a lively traffic went on almost until midday. All this in view of the enemy aviators, who were constantly circling over our positions. "We cannot do it," was the invariable refrain. The traffic police did not interfere, and the principal cause of this failure was: instruction was given only as to what was not to be done, only written prohibitions were given, but energetic steps were never taken. If here and there an efficient commander did so, it was an exception.

The carrying out of local preparations was not in the right hands in our sector. A Landwehr Division, which had taken over our position—necessity required it to serve as a substitute—had been given this task, at which it set to work with more zeal than knowledge—it

had never participated in an offensive—and sufficient expert assistance was not given it.

Thoroughness depends always upon the great factor—time. Enemy operations, inclemency of the weather, and unforeseen difficulties must be taken into account. I believe that this was not done, and they were in any case precipitated measures, if one proceeds from the standpoint that the attack had to be made here. It was not possible for the infantry to make the necessary reconnaissance. The intermediate commands—by these I mean Divisional and Corps Headquarters, Group and Army Commands—constantly failed to recognize during the War how much time reconnaissance demanded, and that it was absolutely necessary if anything was to succeed. The map does not suffice in practice.

No preparations of any kind had been made for the protection of the infantry; not a trench dug, not a dug-out constructed; the troops were defenceless against that hell. When their own lives are at stake, even the assaulting infantry likes to dig itself in. But the leaders would not permit this. The troops were to remain "fresh"! The roads in woods were marked incorrectly or not at all, and indication marks for night (whitewashing of trees, wisps of straw, etc.) were completely lacking. The artillery complained from the beginning of being overburdened. The supplying of ammunition did not go very smoothly. On several occasions wrong ammunition was taken to the battery positions. Quantity was also lacking, so that the artillery fire on the 15th was not very strong and of only insignificant effect: the enemy artillery had sustained almost no losses. Guns were changed at the last moment (I do not mean with this the bringing up of the last batteries during the night preceding the drive), and here and there the distribution of fire was differently regulated, so that the liaison officers detailed to the infantry were almost entirely uninformed and were consequently useless. Once again the artillery could not understand that the infantry desired only such liaison officers as were informed on all details—men who knew every battery position, every target, etc., but not "advisers" in the person of second lieutenants with two months' service, who should assist a major or an old captain, and who generally know less of the whole business of fighting than most infantry platoon commanders. I do not fail to recognize that the difficulties of setting up 1,000 guns in a division sector and of providing ammunition for them were enormous; but matters were better in the previous offensives.

The engineers were drawn from various units, were often not acquainted with their leaders nor with each other, and the majority were naturally not equal to their task, because they were not sufficiently accustomed to working together.

As for the troops themselves, it is true that they had been four weeks in the rear, but they were not really fresh. Tactical considerations caused the 36th Infantry Division to be left in the rear in the environs of Fère-en-Tardenois. But the Higher Command undoubtedly had a wrong conception as to the intrinsic worth of these

troops later. I know, of course, that they were believed to be "fresh," but they had in reality recuperated only a little. If troops are to rest, they should be sent 50 kilometres behind the front, where they scarcely hear the roar of cannon, where they need not be housed in cellars, but may have decent quarters with light and air, benches and tables, with a good stove in winter, and where Nature gives new life to body and soul. There must be woods and water, a village with a church; the man from the front must feel at home if he is to recuperate.

Troops can be called fresh only if they have faith in their cause and in themselves. It was not a good omen when people said that "the enemy knew everything." It was more than idle talk, too. Furthermore, many a company commander cast anxious glances at his little group when he came out with it in the morning for drill. What remained of our companies of 1918? Not more than an average of 60 men, of whom only 40 carried rifles, the remainder being machine-gun and Granatwerfer crews, detailed to the Intelligence troops or elsewhere. Such a company was no longer a match, as an assailant, for an American one, which entered the battlefield with 160 to 180 men, but only as a defender of an advantageous position. And the men knew this. In addition, influenza had raged in our ranks and had seriously affected most of the men.

That, in spite of all, the infantry made such a heroic attack on 15th July was surprising. It proved their staunch union; officers and men were as one man. They were able to do it, although many of them felt sick and miserable, and this refutes the idle talk at home that a gulf had slowly opened up during the War between officer and man. No, the mighty experiences at the front united us closely; only that the losses of 1918 were so heavy that very few of the old soldiers, who had joined us in former years, remained. Every four weeks, almost after every battle, new men came. Company and platoon leaders were lacking during a greater part of the time. That the inner cohesion gradually left much to be desired, because no one was acquainted with his fellows, was not a consequence of the long duration of the War, but of the hard battles of the last year.

When the troops went into the battle of the Marne on 15th July, the subordinate commanders seriously feared that the preparations had not been thorough enough, and that defeat was impending. The result showed that they were right. Even though the offensive was carried out under unfavourable auspices, the possibility of its succeeding was slight from the beginning. The tactical plan was a doubtful one. We relied on suppositions which were uncertain; above all, that the enemy would fight poorly.

If a really masterful general had opposed us, we should have met with another Sedan; he would have let us cross the Marne and make a drive 20 to 30 kilometres deep, and then he would have got us. The flank attack from the forest of Villers-Cotterets would have proved our annihilation. Even though we had defeated several exhausted and weary divisions on 27th May in the Chemin des Dames, and had called this feat "a thrust at the enemy's heart," it only now became clear to us: France is aroused, and it is a question of life and death!

THE WAR FROM THE GERMAN SIDE.

THE CAPTURE OF NAMUR, AUGUST, 1914.

Introduction.

THE narrative of the siege and capture of Namur forms the second part of the work of Captain Marschall von Bieberstein, the first of the series of Historical Monographs by the German General Staff. While not perhaps in itself so astonishing a feat of arms as the taking of Liège, the seizure of this formidable fortress was of the utmost importance for the success of the German plan of campaign in the west. Namur covered the right flank of the Franco-British Armies on the Sambre, which had to meet the first shock of the German right wing in swinging through Belgium, and the loss of its support, exposing them as it did to envelopment, was partly the cause of Joffre's decision to commence that retreat, which only came to an end with the Battle of the Marne, and left for four years the greater part of north-eastern France and all Belgium in the hands of the invaders.

The German Advance through Belgium up to the Investment of Namur.

On the evening of 17th August, when the last forts of Liège fell into German hands, the position of the German Armies was as follows :—

First Army (Von Kluck).

IInd, IIIrd, IVth and IXth Corps ; IIIrd and IVth Reserve Corps ; 10th, 11th and 27th Landwehr Brigades ; 1 Pioneer Regiment	Region west of Hasselt—St. Trond and to rear

Second Army (General Von Bülow).

VIIth and Xth Guard Corps ; Guard Reserve ; VIIth and Xth Reserve Corps ; 25th and 29th Landwehr Brigades ; 4 Mortar Batteries ; 1 10-cm. Gun Battalion ; 2 Heavy Coast Mortar Batteries ; 2 Pioneer Regiments	Line : west forts of Liège—Huy—Ferrières.

Third Army (General Von Hausen).

XIth, XIIth and XIXth Corps ; XIIth Reserve Corps ; 47th Landwehr Brigade ; 1 Mortar Battery ; 1 Pioneer Regiment	On east edge of the Ardennes, right flank 20 miles south-west of Malmèdy.

Fourth Army (Duke Albrecht of Würtemberg). VIth, VIIIth and XVIIIth Corps; VIIIth and XVIIIth Reserve Corps; 49th Landwehr Brigade; 2 Mortar Batteries; 1 Pioneer Regiment.	From north corner of Grand Duchy of Luxemburg to south of Thionville.
Fifth Army (Imperial Crown Prince). Vth, XIIIth and XVIth Corps; Vth and VIth Reserve Corps; 13th, 43rd, 45th, 53rd and 9th Bavarian Landwehr Brigades; 4 Mortar Batteries; 2 Pioneer Regiments	
Sixth Army (Crown Prince Rupprecht of Bavaria)	In Lorraine.
Seventh Army (General Von Heeringen).	In Alsace.

Forming screen before the right German wing in Belgium:—2nd Cavalry Corps (Von der Marwitz, three Cavalry Divisions) and 1st Cavalry Corps (Von Richthofen, two Cavalry Divisions).

The task of the First and Second Armies was to advance on the 18th north of the Meuse, cut off from Antwerp the five Belgian divisions reported to be in the area Diest—Tirlemont—Wavre and reach the line Brussels—Namur. One division of the 2nd Cavalry Corps was to cover the advance of the First Army; the other two to take position at Perwez, in front of the Second Army. Farther to the south the Third Army was to advance against the line of the Meuse between Namur and Givet, covered by the 1st Cavalry Corps moving on Dinant. The Fourth and Fifth Armies were to advance in the general direction of the middle Meuse south of Givet, pivoting on Thionville. Thus the whole of the five Armies would eventually be in a position to advance south-westwards from the line Brussels—Thionville. The First Army was to mask Antwerp; the inner wings of the Second and Third Armies were to reduce Namur as soon as possible.

On the 20th, after an advance which had met with little resistance from the Belgian Army, withdrawn into Antwerp, and from the French advanced troops north and north-west of Namur, the leading units of the First and Second Armies had occupied Brussels and crossed the railway thence to Namur; the latter fortress was observed by the Guard and Guard Reserve Corps in position just out of range of its guns; the right wing of the Third Army was also approaching it from the south-east. The First Army now wheeled to the left, against the line of the Sambre west of Maubeuge, the Second Army between that place and Namur; the Third Army continued towards the Meuse below Givet. By the 24th the three Armies had forced both river lines after hard fighting and joined hands south-west of Namur. General Von Gallwitz, G.O.C. Guard Reserve Corps and formerly Inspector of Field Artillery of the Army, was placed in command of a group consisting

of the Guard Reserve and XIth Corps, two Pioneer Regiments, one battalion 10 cm., one battalion 13 cm., five battalions 21 cm. and one battalion 42 cm. Siege Mortars, with four Mortar Batteries of Austrian 30.5 cm. Mortars, with instructions to undertake the capture of Namur.

This fortress consisted of nine separate forts, three (Maizeret, Andoy and Dave) in the bend of the Meuse south-east of the town, two (St. Héribert and Malonne) between that river and the Sambre to the south-west, and four (Suarlée, Emines, Cognelée, and Marchovelette) north of the Meuse. The town covered the confluence of the Meuse and Sambre and is the meeting place of railways from Brussels, Tirlemont, Liège, Luxemburg, Dinant, and Maubeuge. The garrison consisted of two infantry brigades, four machine-gun companies, twelve batteries of fortress artillery, and numerous field batteries, a strength of about 18,000 men all told.

The Investment of Namur.

General Von Gallwitz decided that the attack should be begun on 20th August by the 3rd Guard Division against the north-east front of the fortress and by the XIth Corps against the south-east front, respectively north and south of the Meuse. Small outlying posts of the enemy had already been forced back during the preliminary approach march; it had also been ascertained that, in view of the careful preparations made for defence, a *coup de main* offered no prospect of success and resort would have to be had to a thorough and powerful bombardment. In order to deal with an attempt on the part of the enemy, who was observed to be assembling in strength around Fort Cognelée, to debouch to the north, a division of the Guard Reserve Corps, hitherto held in reserve south of the Meuse, was brought over to the north bank, by way of Andenne; during its passage through this town it was attacked by the inhabitants and had to undertake stern reprisals for its own security.

Meanwhile the 3rd Guard Division, progressing towards Fort Marchovelette and repulsing an attack on their right flank, were covering the establishment of the siege artillery, which was completed by the evening of the 20th unmolested by the enemy. South of the Meuse the XIth Corps had also taken up position facing Forts Maizeret and Andoy and deployed their heavy guns in rear of the infantry. On the north bank against Forts Cognelée and Marchovelette there were available for service two battalions 21 cm. Mortars, two battalions Austrian Heavy Coast Mortars, one battalion 10 cm. and one 13 cm. guns, one 42 cm. Naval Gun Battalion, one battalion Heavy Field Howitzers; on the south bank two battalions 10 cm. guns, half battalion Heavy Field Howitzers, two battalions 21 cm. Mortars, two battalions Austrian Heavy Coast Mortars.

Reports arriving on the evening of the 20th determined Von Gallwitz to direct his main effort rather against the north-east front, where the attack was easier than in the south-east. The 1st Guard Reserve Division was therefore moved to the Tirlemont Road north of Fort Cognelée; the 22nd Division of the XIth Corps took over all the south-east front;

the 38th Division being moved by Andenne to the north bank as general reserve. Fire was opened against the forts only at noon, owing to the mist, and continued all day. The movements of the infantry given above were not completed till late on the evening of the 21st and even then the greater part of the 38th Division was still south of the Meuse. Orders were given that the attack should be carried out by the 1st Guard and Reserve and 38th Divisions, under one commander, Von Pleskow, between Forts Cognelée and Marchovelette, but this operation could not take place before the 23rd at the earliest; the 22nd would therefore be devoted to a continuance of the bombardment. However, things fell out differently. The 3rd Guard Division became involved in fighting along all its front with superior enemy troops, its right wing being engaged in the sector assigned for the main attack next day. Moreover, the march of the 38th Division was unduly delayed and it was recognized that it could not hope to reach the battlefield with all its forces in time for the attack. Accordingly it was arranged that the 3rd Guard Division should take part in the sector already held by it, the available part of the 38th Division to the right of them and the 1st Guard Reserve Division on the extreme right.

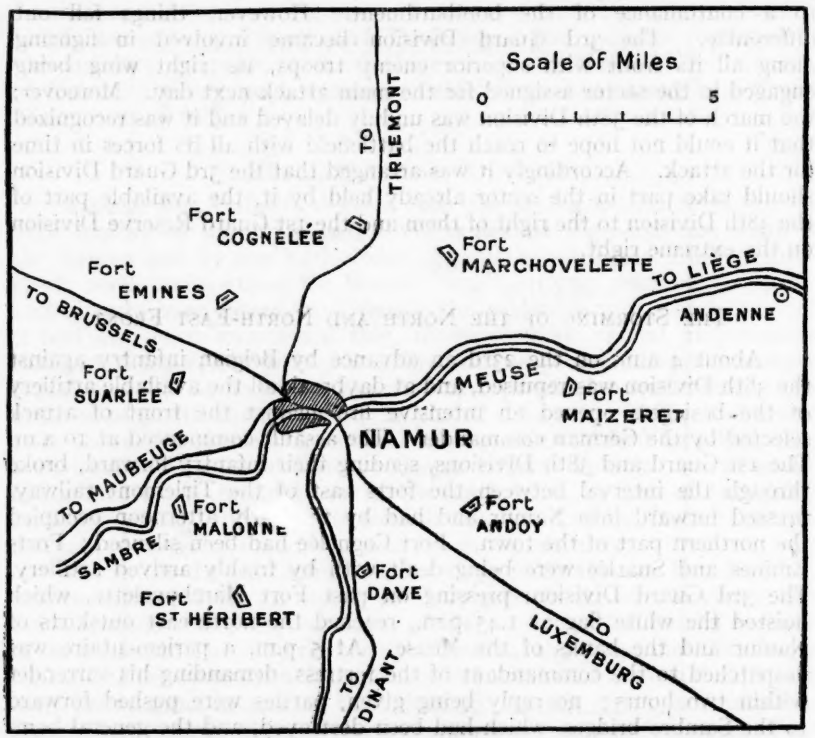
The Storming of the North and North-East Front.

About 4 a.m. on the 23rd an advance by Belgian infantry against the 38th Division was repulsed, and at daybreak all the available artillery of the besiegers opened an intensive fire against the front of attack selected by the German commander. The assault commenced at 10 a.m. The 1st Guard and 38th Divisions, sending their infantry forward, broke through the interval between the forts east of the Tirlemont railway, pressed forward into Namur and had by the early afternoon occupied the northern part of the town. Fort Cognelée had been silenced; Forts Emines and Suarlée were being dealt with by freshly arrived artillery. The 3rd Guard Division, pressing on past Fort Marchovelette, which hoisted the white flag at 1.45 p.m., reached the north-east outskirts of Namur and the banks of the Meuse. At 5 p.m. a parlementaire was despatched to the commandant of the fortress, demanding his surrender within two hours; no reply being given, parties were pushed forward to the Sambre bridges, which had been destroyed, and the general bombardment was resumed. A further attack was prepared for 5 a.m. next morning.

Fire was again opened early on the 24th against the south-east front, which had not been seriously attacked the previous day; meanwhile the 38th Division passed over the Sambre bridges, now repaired, and worked its way forward against the rear of Forts Malonne and St. Héribert. The 1st Guard Division remained as safeguard for the artillery north of the Meuse; the 3rd Guard Reserve Division garrisoned the town. The 22nd Division on the south-east front reported the fall of Fort Maizeret; its artillery was engaged against Forts Andoy and Dave.

The Fall of Namur.

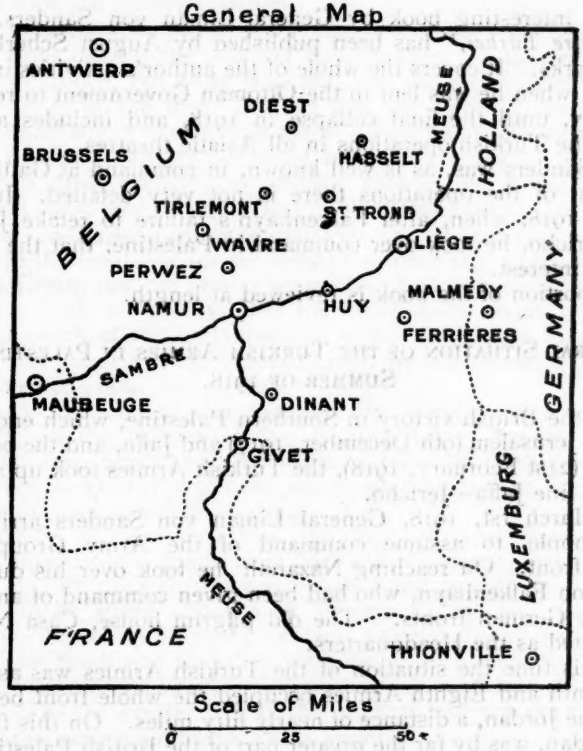
An assault against Fort Andoy on the night of the 23rd failed, but after further bombardment next day the work surrendered about noon. Fort Dave was still holding out that evening. South-west of the town the 38th Division commenced its advance at 2 p.m. on the 24th, but before it had come into contact with the defenders of Fort Malonne news came in that it had been taken by Lieutenant Von der Linde of the 4th Guard Regiment, who approached the fort and induced its commander



to yield to himself and his four companions. Most of the garrison had already fled, and the five daring adventurers thus came into possession of an absolutely intact fort, with four 21 cm. guns and several others of smaller calibre, 100 rifles and pistols, 500 shells, several thousand cartridges, and prisoners to the number of five officers and twenty men. Lieutenant Von der Linde received the Order Pour le Mérite for this exploit. Fort St. Héribert was captured after a short bombardment about 9 p.m.

Thus of the nine forts of Namur six were in German hands and the fall of the other three, exposed to a concentrated bombardment from

artillery of the heaviest calibre, could only be a question of time. Even before the orders for the further movements of the two besieging corps received from the Second Army at 2 a.m. on the 25th could be carried out, these works had been forced to surrender. It was established that a large proportion of the Franco-Belgian garrison had evacuated the fortress early, so as to avoid being cut off by the concentric advance of the German Armies; only weak rear-guards had been left behind and these were in insufficient strength to occupy the intervals between the forts and afford effective resistance to the attackers. Most of



these troops were taken prisoner; some few escaped southwards, only to be rounded up in the open country; very few managed to rejoin the Allied Armies. The total booty at Namur came to 6,700 prisoners, twelve field guns and all the armament of the forts. The German losses were about 300 dead and 700 wounded.

According to the orders received the Guard Reserve Corps, being the brigade in garrison at Namur, marched off to rejoin the Second Army, and the XIth Corps followed the Third Army; both of these Armies had already passed beyond Namur and were pressing back the Allies retiring towards Paris.

THE TURKISH OPERATIONS IN PALESTINE, 19th-23rd SEPTEMBER, 1918.

By General Liman von Sanders.

A MOST interesting book by General Liman von Sanders, entitled "*Fünf Jahre Türkei,*" has been published by August Scherl, Berlin, price 54 marks. It covers the whole of the author's activities in Turkey from 1913, when he was lent to the Ottoman Government to reorganize their Army, until the final collapse in 1918, and includes a general sketch of the Turkish operations in all Asiatic theatres.

Von Sanders was, as is well known, in command at Gallipoli, but the account of the operations there is not very detailed. It is from February, 1918, when, after Falkenhayn's failure to retake Jerusalem or hold Jericho, he took over command in Palestine, that the narrative is of most interest.

This portion of the book is reviewed at length.

A.—General Situation of the Turkish Armies in Palestine in the Summer of 1918.

After the British victory in Southern Palestine, which ended in the capture of Jerusalem (9th December, 1917) and Jaffa, and the occupation of Jericho (21st February, 1918), the Turkish Armies took up a position north of a line Jaffa—Jericho.

On March 1st, 1918, General Liman von Sanders arrived from Constantinople to assume command of the Army Group on the Palestine front. On reaching Nazareth he took over his duties from General von Falkenhayn, who had been given command of an army on one of the German fronts. The old pilgrim house, Casa Nova, had been selected as the Headquarters.

At this time the situation of the Turkish Armies was as follows: The Seventh and Eighth Armies occupied the whole front between the sea and the Jordan, a distance of nearly fifty miles. On this front, west of the Jordan, was by far the greater part of the British Palestine Army. East of the Jordan, Arab tribes, led and supported by the British, were carrying on a form of guerilla warfare. To oppose them the Turkish 20th Division, after the evacuation of Jericho, had crossed the Jordan and taken up a position south of Es Salt, having a detachment to guard a bridgehead on the river where it is crossed by the Jordan—Shunet Nimrin road. The Lower Jordan down to the shores of the Dead Sea was watched by a few camel-corps patrols. Farther east again, the Hedjaz Railway was patrolled by detachments of the Fourth Army, whose VIIIth Corps, the only complete large unit of that Army, was

operating against the rebel Arabs who had occupied Tafile, in the centre of the rich corn-growing country south-east of the Dead Sea.

The lines of communication through Northern Palestine were guarded by the Second Army, with headquarters at Aleppo. It had to watch the coast-line from a point half-way between Haifa and Beirut northwards past the Gulf of Alexandretta to beyond Mersina.

The operations on and east of the Jordan during the summer of 1918 did not greatly alter the general situation, but, whereas the British were constantly improving their communications with Egypt, and thereby enabling the troops to retain their fighting efficiency, it was otherwise with the Turkish Armies.

The unfavourable progress of the operations on the European Western front during the summer had its effect on the confidence of the Turkish troops, but more fatal still was the lack of reinforcements to relieve units in the front line, so that the fighting troops became war-weary and began to desert in mass. This was particularly the case with the Eighth Army on the coast sector of the front. In addition, there was a great epidemic of disease during the summer months, malaria and dysentery taking a heavy toll of the Armies.

Of the ten Turkish infantry divisions on the Palestine front, eight had been in the front line for six months without any relief, and neither the Army Group nor the armies themselves had any reserve worthy of the name. Each of the divisions numbered only about 1,300 rifles,[1] and the strength of the battalions, of which there were nine to every division, was about 130-150 rifles, though in some cases sickness had reduced them to about 100 strong.

Towards the end of the summer the number of deserters was continually on the increase. The Eighth Army, between the 15th August and 14th September, lost about 1,100 men in this way; when caught, they invariably made the same complaint—that they had not enough to eat, nor sufficient clothing.

Especially serious, too, was the lack of nourishment for the transport animals—the roads were bad and the supply system largely depended on the pack-animal service—but for months they had only been able to be given about 2 lb. of oats a day, and the summer drought had burnt up all the grass and greatly diminished the water supply. The result was that they were dying by hundreds. An order to move the position of a battery a few hundred yards was most difficult to carry out, as the greater part of the animals had not the strength to pull the guns across a difficult bit of country.

Owing to the great numerical superiority of the British Flying Corps in Palestine, German aeroplane reconnaissance had practically

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[1] Von Sanders would have it believed that his ten divisions only averaged 1,300 rifles, making his total fighting force 13,000. Our intelligence showed that he had 4,000 sabres, 32,000 rifles and 400 guns—a ration strength of about 100,000. Apart from killed and wounded, the Egyptian Expeditionary Force captured 75,000 prisoners between 19th September and 26th October. Of these 200 officers and 3,500 other ranks were Germans or Austrians. In addition 360 guns were taken.

ceased by September; on the 19th only five aeroplanes were available for active operations.

Realizing that the resisting power of his armies was becoming weakened, General von Sanders, at the beginning of September, contemplated their voluntary withdrawal to a front with the right on Lake Tiberius and the centre and left along the Yarmuk Valley. He, however, gave up the idea, as it would have meant the evacuation of the entire Hedjaz Railway[1] and of the country east of the Jordan, south of Deraa, whereas no better facilities would be gained for preventing the continuation of the Arabian operations against the rear of his armies. He considered that it would be preferable to hold on to his present positions, rather than undertake a long retreat with troops whose fighting spirit was already broken.

B.—The British Offensive on the 19th September, 1918.

On the 17th September a deserter from the British Army—a sergeant of an Indian regiment—came into the right group of the Eighth Army, defending the coast-sector, and said that it was intended to deliver a strong attack there on the 19th. On the same day it was reported that the railway north and south of Deraa was threatened at various points by large detachments of Arab troops, and had already been broken in a few places.

General von Sanders realized that these attacks on his only line of communication signified the beginning of serious fighting. He ordered 300 men of the infantry depôt regiment left in Haifa to leave by rail at once for Deraa. The Fourth Army commander was ordered to assemble all available men and send them without delay also to Deraa. These reinforcements, under the command of Major Willmer, enabled the railway to be protected and the work of the German railway troops restored the situation on the line. The Arabs were driven back eastwards.[2]

During the night of the 18th-19th, severe fighting began on the front of the Seventh Army, between the mountainous country south of Nablus, about Tel Azur and the Auja, a small tributary of the Jordan.

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[1] The Pan-Islamic party forbade the giving up of the Hedjaz Railway; it was a holy enterprise built by subscriptions from the Faithful.

[2] The German Headquarters Staff walked into the trap set for them; the attacks by the Arab force on the railway were fixed for the 16th September, precisely in order that the German reserves in the Haifa-Nazareth area might be sent away towards Deraa, and not have time to get back to oppose the British cavalry entering the Plain of Esdraelon on the night of 19th-20th September. The Arab force was not driven away. It carried out a circular tour embracing the three railways radiating from Deraa. On 16th September it wrecked bridges 16 miles S.E. of Deraa; next morning it was at Tel Arar, five miles N. of Deraa, blew up the bridge, and destroyed every rail for four miles. It went on and burned Mezerib Station and two trains on the western branch. Finally it recrossed the railway at Nasib and cut off the construction train attempting to repair the damage of the first day. Far from the railway being restored, no train got through from Damascus to Deraa for a week.

At 3.30 a.m.,[1] on the 19th, a violent bombardment began against the entire position of the right wing of the Eighth Army, between the coast and the foot of the mountains, a frontage of about ten miles.

Shortly after dawn squadrons of British aeroplanes appeared over the headquarters of the Seventh and Eighth Armies and of the corps headquarters of those armies, as also over the central telephone exchange in El Afule; they bombed the latter from a low altitude and cut many of the cables. This was a simple task, as there were only two air-defence guns in the whole sector between the coast and the Jordan. A number of cables were also cut during the morning by the Arabs. Telephonic communication between Tul Keram and Nazareth failed about 7 a.m., and the wireless station of Eighth Army Headquarters did not answer any calls after that hour.[2]

Between 9 and 10 a.m. Seventh Army Headquarters reported from Nablus that, according to information from Colonel von Oppen, the front of the right wing in the coast sector had been broken through, and that a strong force of enemy cavalry was advancing along the coast northwards. General von Sanders, therefore, sent a message immediately to Colonel von Oppen, through Seventh Army Headquarters, to go with what troops he had at his disposal to the coast sector by road and rail from Kalkilieh. Colonel von Oppen had, however, forestalled the order, and reported that three battalions and two squadrons were already on the march from Kalkilieh and Felamie.

The British, however, had broken through the western portion of the coast sector by 7.0 a.m., without meeting serious resistance, and by that hour were already in occupation of the high ground west of Et Tire, where they brought a number of machine guns into position. The weak 46th Division, under Major Tiller, had held up the enemy advance for a time, but was practically wiped out in so doing.

The causes of the complete and rapid collapse of the 7th Division and the two regiments of the 20th Division, which were holding the western part of the coast sector, remain even to this day unexplained. Although the force was a weak one to hold this extensive sector, it had held its ground well in the previous fighting; and yet on the 19th September, after two hours' bombardment, the men had all disappeared before the first enemy infantry attack had reached their positions. They had no fight left in them. During the remainder of the retreat, General von Sanders relates that he did not see a single officer or man of these divisions.

As telephonic communication with Nablus from the headquarters in Nazareth was broken off for two hours after the order had been sent to Colonel von Oppen, the whole extent and effect of these events could not be appreciated at the moment, though it was generally believed

[1] 4.15 a.m. according to British accounts.

[2] The destruction of all intercommunication between the higher command and its formations was part of the British plan, and it was very effectively carried out; information had shown that El Afule, Jenin, Nablus, and Tul Keram were the chief telegraph and telephone centres, and the Royal Air Force had the task of wrecking these, whilst the Arab force had been directed to keep the telegraphs in the north and east continuously interrupted.

that the 7th, 20th, and 46th Divisions were retiring to previously prepared positions in rear. The Commandant at Haifa was told to keep his troops on the alert, as enemy cavalry was advancing along the coast.[1]

The troops belonging to the 19th Division, of the left wing of the Eighth Army about Kefr Kasim, from which the enemy's break-through could be seen, likewise lost ground rapidly. Both infantry regiments, the 57th and 77th, in the front line of this Division, left their positions independently and retired without orders, in spite of the fact that they had not been attacked. Colonel von Oppen immediately sent orders to them to form front again, but in the disorder of the retirement many of the men had already left their units.

At about 10 a.m. British cavalry with armoured cars had also broken through the front at Hableh and Kalkilieh east of the railway, and were advancing northwards.

Shortly afterwards the whole left wing of the Eighth Army, under Colonel von Oppen, had to be withdrawn from the positions it had held for many months, moving back at first to the high ground about Kafr Tilt. It was clear that scarcely any further resistance would be offered in the coast sector, and that therefore the right flank of the left wing was exposed to an enemy attack.

Shortly after noon, as soon as the communication between Nazareth and Nablus had been restored, news, completely unexpected, arrived to the effect that the enemy was continuing his advance rapidly on the whole front of the coast sector, and that part of the Eighth Army was apparently moving from Tul Keram towards Anebta. A quantity of artillery was said to have been lost. It was no longer possible to get into communication with the Eighth Army Headquarters in Tul Keram.

Seventh Army Headquarters reported that the enemy attacks against its front had been, for the most part, repulsed, but that the IIIrd Corps was about to be withdrawn to a position in rear, so as to keep touch with the forces under Colonel von Oppen. General von Sanders assented to this and ordered the Seventh Army commander to send the 110th Infantry Regiment, which was at his disposal in Nablus, and any other available troops, to Anebta to block the passage of the valley there. Anebta was an important point, for the high ground rises steeply on either side of the road and forms a narrow defile, which could well be defended by a weak force.[2] So long as Anebta and the high ground on either side of this village could be held, the left wing under Colonel von Oppen could continue its retreat due north by way of Messudie. No further information could be obtained of the divisions that had been holding the coast sector.

The Fourth Army commander in Es Salt was informed of the situation, and ordered to place a cavalry regiment of the 3rd Cavalry

[1] The cavalry only used the coast to pass through the Turkish line. Afterwards they turned north-east to cross the hills of Samaria.

[2] This defile was completely blocked by the guns and transport abandoned by the Turks as the result of repeated bombings by the R.A.F.

Division at the disposal of the Seventh Army immediately. The commander reported that only slight fighting had taken place on the Jordan front of the Fourth Army. The 24th Division was being attacked west of the Jordan, but had, as yet, made only a slight retirement.

Since there was a danger that the enemy's cavalry which had broken through in the coast sector might turn from the coast in a north-easterly direction against the line of retreat of the Eighth Army, General von Sanders sent orders at 12.30 p.m. to Major Frey, commanding the Pioneers of the Army Group, to occupy the defile at Lejjun [1] at once. He placed at his disposal the available troops of an infantry depôt-regiment (Würthenau) and the lines of communication guards which were within call, in and near Nazareth, making in all a force of six companies and twelve machine guns, and ordered him to march immediately by El Afule to Lejjun.[2] After the departure of Major Frey's detachment, the only troops left in Nazareth were some 150 Arabs of the Würthenau Depôt-Regiment and its training personnel.

During the afternoon the Seventh Army Headquarters reported that the battalion of the 110th Infantry Regiment was on the march to Anebta. It was impossible to send any more troops, as all the battalions held back in reserve were urgently needed to resist the attacks against the front of their own units. The report added that Eighth Army Headquarters was believed to have reached Anebta, and that a weak force of the 46th Division was there with it. Colonel von Oppen's force was hard pressed in front, but its greater danger lay on its right flank from those of the enemy troops who had turned inwards from the coast.

About 3.30 p.m. directions were given to Seventh Army Headquarters in the event of a further general retreat being necessary. The Seventh Army commander was told to forward these directions to Fourth Army Headquarters in Es Salt and to Eighth Army Headquarters in Anebta. They ordered the Seventh Army to use the Beit Hasan—Beisan road, while Colonel von Oppen's force retired by Messudie on Jenin, the Fourth Army at first moving back towards the Wadi Zerka. The Commander-in-Chief would remain at Nazareth for the time being. Towards evening Seventh Army Headquarters reported that the IIIrd and XXth Corps had had to take up another position farther in rear.

It was hoped that the good road built early in the summer from Azzun to Deir Sheraf would be kept open for Colonel von Oppen's force, in spite of the pressure against its flank. At Deir Sheraf the main road leading north to Jenin branches off from the Nablus valley road.

General von Sanders did not know till several days later that the disorder among the Turkish troops, the 16th Division excepted, was much worse than all the reports made out. On the afternoon of the 19th, he

[1] The ancient Megiddo.

[2] This was the force encountered near Lejjun by the 2nd Lancers, who charged it, killed 46, and made 470 prisoners.

still hoped that the troops from the coast sector had been able to take up a position farther in rear, forming front against the enemy cavalry, and that the loss of communication with them was only temporary. It had been a great disadvantage to Headquarters that throughout the morning the flying section had been unable to assist in following the course of events either on the battle-fronts or on the lines of retreat. As a fact, the road from Messudie to Jenin, by the afternoon of the 19th September, was already overcrowded with the retreating baggage columns of the Eighth Army and with refugees. The latter consisted for the most part of servants of the many Turkish staff officers and of workers on the lines of communication; in normal times it was impossible to get an accurate estimate of the incredible number so employed. The road from Tul Keram to Anebta, and the foot tracks along the high ground on both sides of it, were covered with long rows of refugees, so that the continuous bomb attacks of the British flying squadrons from a low altitude soon caused piles of dead men and horses and broken wagons along it. The repeated efforts of individual officers to gather small detachments around them out of these disorganized masses and offer a show of resistance failed, owing to the complete indifference of them all to everything except their own personal safety. Such then was the real state of affairs of the right wing of the Eighth Army.

There were no German troops in the coast sector.[1] The numerous small detachments distributed among the Turks for employment at the wireless stations and on telegraph, telephone, railway and artesian-well duties and for hospital work, had mostly tried to break their way through towards Anebta, or direct to Sileh on the Jenin road, but only a few of them succeeded in doing so.

The state of affairs on the front of the left wing of the Eighth Army under Colonel von Oppen was very different. The fighting was borne by the Asiatic Corps[2] and the 16th Division, whose 125th Regiment, in spite of the ever-increasing pressure against its right flank, continued to fight determined rearguard actions on a succession of ridges till night set in. The Seventh Army carried out its withdrawal from position to position in a similar manner in good order, as also the 24th Division in the Jordan valley. Had any moderately strong forces been available in reserve, there can be no doubt that the situation could have been restored there. At those places where the troops stood and fought, in spite of their weak numbers, they held up the British advance and made fresh deployments necessary.

Behind the divisions of the Seventh and Eighth Armies, all of which were employed in the fighting line on a front out of all proportion to their strength, was an area of over 125 miles in length, completely empty of fighting troops. In it were the remnants of the two Arabian depôt regiments, countless communication depôts, garrisoned by a few German and many Turkish communication troops, in addition

[1] See note 2 on page 328.

[2] The "Asiatic" Corps consisted of German troops. It was posted in the hill country, which lent itself to defence.

to various labour formations of little value; the aerodromes with their personnel; the motor-car parks, depôts and workshops; the numerous hospitals and convalescent depots, filled to overflowing; and the Arabian battalions of the coast fortress troops, in touch with which, farther to the north, were the advanced posts of the weak Second Army.

On the evening of the 19th the commandant of Haifa reported to Nazareth that there was no sign of any enemy in that district. Throughout the day not a single message had arrived from the Eighth Army commander: it was not known till later that he had been cut off from any communication with his divisions in the coast sector of the front. Since the morning, as all the wires had been cut by accident[1] or by the enemy's fire, Colonel von Oppen reported during the evening that he had had to bend back his right wing still farther, and that, under cover of the night, he would withdraw towards Deir Sheraf.

In the course of the evening General Von Sanders ordered local outposts to be placed in position for the protection of Nazareth. They were to be composed of the company formed by the German office clerks, orderlies, motor drivers, typists, and postal officials in Nazareth, and at 3 a.m. on the following morning these were relieved by the remainder of the Würthenau Infantry Depôt Regiment. The roads from El Afule and Haifa were to be watched and guarded at the point where they rise steeply on to the plateau of Nazareth.

During the night no reports of any particular interest came in.

C.—The Capture of Nazareth and the Retreat Towards Damascus.

At 5.30 a.m. on the following morning, the 20th September, loud shouting and cries of alarm, followed almost immediately by rifle and machine-gun fire, rang out in the southern portion of Nazareth, where General von Sanders had his headquarters. The British had got into the town in the hope of capturing the Commander-in-Chief, though how they had managed to get in was unknown, as the outposts of the depôt regiment did not return; but it was generally believed that they had been guided by Arabs along the bridle-tracks through the mountains. The British had at once taken possession of the Hotel Germania about 200 yards from the Headquarters in Casa Nova, and taken prisoner several officers and officials staying in it; also a number of motor drivers who were at work on their cars in the southern part of the town. British machine guns soon afterwards opened fire on the town from the high ground to the south, east and west. Heavy street fighting rapidly developed: marksmen from the company formed by orderlies and clerks of the Headquarters' office took up positions behind walls and enclosures; while others fired from windows and balconies. When the few available men had been collected and reinforced by the Turkish communication troops in the town, small detachments were sent out to reoccupy the high ground to the west. Any men of the depot regiment still left were also to co-operate in this movement.

[1] Not by accident—see note 2 on page 329.

Shortly afterwards, it was reported that the exit from the town leading to Tiberias was still free. The road passes not far from the French orphan asylum and leads down by a steep, winding descent into the valley. It could have been held easily by a few cavalrymen with machine guns, and the only open exit out of Nazareth thereby blocked.[1] As it was, the ambulances and administrative officials were able to leave the town soon after the surprise attack had been delivered and while the street fighting was still in progress.

The strength of the enemy could not be estimated immediately, and at first it was considered to be only a few squadrons. The quantity of machine guns, however, seemed to General von Sanders to suggest the pressure of a greater force.

The wireless station east of the French orphan asylum had been destroyed by its personnel without order, after having sent an urgent request to Haifa for reinforcements, and the telephonic communication between Headquarters and the armies had been completely broken at the beginning of the attack, as the British had captured the central exchange in El Afule.

The danger that the British would, after a time, block the road to Tiberias was accentuated by their advance on to the high ground west of the town. At 8.30 a.m., the situation at his headquarters in Casa Nova being still unchanged, General von Sanders went to the French orphan asylum, where the remainder of the Würthenau Depôt Regiment was assembled. He ordered its commander to attack at once with his whole force against the British detachments which were slowly advancing on foot accompanied by machine guns along the high ground about three-quarters of a mile west of the orphan asylum. After attacking twice without success, he ordered a third effort to be made, cost what it might. This succeeded, and from 10.15 a.m. onwards the British began to evacuate the high ground.

The strength of Major von Würthenau's force must have been greatly over-estimated by the British, for, soon afterwards, General von Sanders saw the led horses of one squadron, followed closely by those of five other squadrons, being galloped up to the dismounted firing lines. About 10.30 a.m. the brigade with three armoured cars went away westwards,[2] the Turkish skirmishing lines following to the farther slopes of the high ground. The British finally disappeared behind the next line of hills, making for Haifa.[3]

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[1] True, but the difficulty was to get there. There was no road available except that through Nazareth and the country was most difficult for cavalry (mounted troops). Esdraelon Plain is only 110 feet above the sea, the high ground north-west of Nazareth is 1,600.

[2] The Brigadier had only six squadrons and one machine-gun squadron available for the actual attack on Nazareth. There were no armoured cars. The enemy force is greatly understated: about 1,000 prisoners were taken, of whom 500 were Germans.

[3] The raid on Nazareth on 20th September was carried out by the 13th Cavalry Brigade after a march of 50 miles in 22 hours. The Brigade went on to El Afule, not Haifa.

The elevated situation of the orphan asylum enabled numerous signals to be seen which were being sent from the railway station at El Afule. It was clear from these that it was already in British possession.

As soon as the British had withdrawn General von Sanders returned to his headquarters at Casa Nova, and found his office almost entirely empty. Some of the men were still firing with machine guns from the windows in a southerly direction, although no enemy was visible. He also found that the greater part of his papers and records had been burnt during the street fighing to prevent them falling into British hands. Those of the papers that still remained were loaded on to motor cars and sent with the remainder of the personnel of headquarters to Tiberias.

The audacious attempt of the British cavalry brigade—which, as was afterwards discovered, had come from Jaffa—to capture the headquarters staff of the Army Group by a rapid night march had failed. The Turks lost 43 killed in the street fighting. The British had sent the prisoners they took on first entering the town away to El Afule at once, and carried away their wounded with them.

After giving orders to Major von Würthenau to march on Tiberias with the rearguard, General von Sanders, with General Kiazim, his Chief of Staff, Major Prigge, and Captain Hecker, left Nazareth at 1.15 p.m., and, after passing through an endless stream of refugees, reached Tiberias at 3.30 p.m. His intention was to withdraw his armies north-eastwards across the Jordan, making every use of the Hedjaz Railway, his only line of communication with Damascus and the north. To cover this railway, he hoped to be able to hold a line from Lake Kule to Semakh with the garrison of Haifa, which was ordered to leave at once for this purpose, leaving the front Semakh—Irbid along the Yarmuk Valley to be held by the Seventh and Eighth Armies as they arrived. The Fourth Army, retiring by the Hedjaz Railway east of the Jordan, was to hold the front Irbid—Deraa.

It was, however, exceedingly difficult to get into touch with the headquarters of the armies. There was no communication with Nablus, and nothing was known of the Seventh Army, except that its headquarters had left Nablus that day, making for Beit Hasan. Neither was there any news of the Eighth Army, and it was not known till a few days later that its left wing, under Colonel von Oppen, had been engaged with the British at Nablus on the morning of the 21st, continuing its retreat at midday by Mount Ebel, and marching through Turbas towards Beisan and the Jordan on the 22nd. The Fourth Army Headquarters were in Es Salt and left for Irbid on the 21st. The troops of this army spent the next days in moving northwards by the Hedjaz Railway from about Amman to Deraa and Irbid.

It was clear that, in order to facilitate the retreat of the Seventh and Fourth Armies to their proposed positions along the Yarmuk Valley and about Deraa, the remnants of the Eighth Army and the Haifa garrison would have to hold Semakh and the Tiberias front at all costs.

However, owing to the few means of communication in that inhospitable country, General von Sanders' orders never reached the headquarters of either the Seventh or the Eighth Armies. The ordinary means of communication of an European country did not exist, and the few telegraph wires that had been laid were constantly being cut by hostile Arabs. The roads were few and far between, and the armies were unable to carry light wireless installations with them, as the transport animals were too weak to pull heavy wagons over the bad roads. Thus it happened that, instead of marching on the front Semakh—Irbid as General von Sanders had intended, the Seventh and Eighth Armies, moving direct on their nearest railway base, Deraa, arrived close together about the 24th-26th on the front Muzerib—Deraa. Both armies had suffered very heavily during the retreat. British aeroplanes had continually bombed the marching columns, especially at places where the roads passed through narrow defiles between the mountains, and had thus blocked them with debris. The feeling that they had no protection against the British airmen had a most depressing influence on both officers and men.

At 4 a.m. on the 25th, before the Seventh and Eighth Armies could be got into their intended positions, Semakh, the keystone of the whole defence, was attacked by a British cavalry brigade. It was only held by a force of 120 Germans, 80 Turks, eight machine guns, and one gun. After one and a half hour's fighting, this force was either wiped out or taken prisoner.[1] A few men had escaped into a motor boat and were making across to the eastern shore of the Lake of Genesareth, when it received a direct hit from a shell and sank.[2]

With the loss of Semakh, General von Sanders could no longer hope to hold the front of the Yarmuk Valley for any length of time. He therefore decided to continue the retreat as soon as possible, to a new position nearer Damascus.

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[1] This brilliant mounted attack by the 4th A.L.H. Brigade was carried out in the dark; troops available: 11th A.L.H. Regiment, 12th A.L.H. Regiment (less one squadron), and the 4th A.M.G. Squadron. The enemy is again understated—there were 100 killed, and 150 Germans and 214 Turks taken prisoner, and ten machine guns captured. Our casualties were also heavy, and were mainly caused by bombs in mopping up buildings; they amounted to 17 killed and 61 wounded.

[2] No; it was sunk by Hotchkiss rifle fire.

THE GERMAN FEAR OF A COASTAL ATTACK IN 1917.

Extracts from GENERAL VON MOSER's book "Feldzugs-Aufzeichnungen" relating to Case "K" for the defence of the coast-line of Belgian-Dutch Flanders, May-June, 1917 (pp. 281-286).

ON the 22nd May General von Moser arrived at his headquarters, Chateau Beekstraat, north-west of Ghent. He left by car almost at once for Bruges, where General Ludendorff had come to discuss the situation in Flanders.

"On the following morning," he says, "after breakfasting with Admiral von Schroeder, commandant of the Marine Corps, and Admiral von Holtzendorff, Chief of the Admiralty Staff, I was present at an animated discussion between General Ludendorff, the two admirals, and the generals commanding the Army groups concerned, with their Chiefs of Staff, Von Kuhl and Ilse. I was thus able to get my first rapid survey of the tactical, strategical and political conditions of the local situation and the opinions prevailing with regard to it. It was abundantly clear to me that our Supreme Command regarded all the plans and threats of the British with the most sanguine and complete confidence. . . .

"On the 24th May I studied, with my staff, the documents in connection with the case 'K' (Küste=coast) that had been entrusted to me. The material was rather incomplete, as this case had till now been in the hands of the commander of the Fourth Army, whose attention was fully taken up elsewhere, and of the commander of the lines of communication at Ghent. It had only been worked out as an 'extra,' and had been dealt with by many different hands, owing to the frequent changes of command. Our work, therefore, consisted in laying a solid foundation for the plan for the case 'K' by means of a detailed and complete memorandum on the subject.

"British public opinion had for some time been demanding the seizure of the German submarine bases, that is, Belgian Flanders. There was ever-increasing information that Field-Marshal Haig was now, with the French and Belgians, preparing an offensive on a big scale against the German land-front and west-front in Flanders, but simultaneously the British press was calling for an attack to be made by the combined fleets on the coastal and northern fronts. British troops, with or without the consent of Holland, were also to land in Dutch Flanders and on Walcheren Island, so as to take possession of

the mouth of the Scheldt and Antwerp, and be able to advance on Ghent and Brussels against the rear of the German Fourth Army.[1]

"As this plan was unquestionably a practical one from a strategic point of view, the German Supreme Command had to prepare counter-measures for every eventuality; and precise instructions were therefore to be issued on the matter.

"I was at first given two infantry divisions and one cavalry division, which were to be stationed between Ghent and Bruges, and at the same time watch the frontier of Dutch Flanders. The operations to be carried out by me in the case 'K' were naturally to be in co-operation with those on the coast and from Antwerp, also with the strong German forces which would be assembled for the purpose further east. Success depended on the rapid execution of the plan, though the beginning and progress of the operations depended to a great measure on the political situation. Whether Holland, for example, would submit to a British advance on its territory, or whether it was determined to oppose it by force of arms; and, in the latter case, whether it could do so without German assistance or would ask for help. As a matter of course, as soon as British troops stepped on to Dutch territory, it would be open to us to do likewise: nevertheless, it was of the utmost importance for us to respect Dutch neutrality for as long as possible.

"Since the operation of a British force against the Belgian-Dutch coast-line involved many different possibilities of landing, the whole question would have to be thoroughly studied without delay.

"On the 25th May I drove to Selzaate on the Belgian-Dutch frontier, along the magnificent Ghent canal, to examine the frontier defences more closely. They were of a peculiar kind, as their main object was to stop the very profitable smuggling business and the secret service system that was closely connected with it. Along the whole length of the frontier was a high wire fence strongly electrified. In climbing over it many a man had met his death.

"On the 28th May I drove to Ecloo, to the headquarters of the 2nd Cavalry Division, and then went with the divisional commander to inspect the 'Holland' position that ran parallel to the frontier. It was only partly completed, the remainder being still in the process of construction. At 4.0 p.m. I went to Ghent to report myself to Field-Marshal Hindenburg, who was at the aerodrome inspecting the big bombing aeroplanes that were about to go over to London. He said that a few direct hits on the Bank of England would do no harm. . ."

On the evening of the 9th June General von Moser was ordered to take command of the "Group Arras." He left Chateau Beekstraat on the 12th June, and that afternoon reached Chateau Lewarde, where he took over his new command from Generalleutnant Dieffenbach, who, with his staff, then left for the Flanders front.

[1] Needless to say, the Allies never had an intention of violating Dutch territory.

NAVAL NOTES.

GREAT BRITAIN.

Admiralty Changes.

The first quarter of 1921, with which the following Notes are concerned, was marked by a complete change of the civil element on the Board of Admiralty. On 15th February it was announced that the King had been pleased to accept the resignation of Mr. Walter H. Long, M.P., as First Lord, on account of ill-health, and to approve of the appointment of the Right Hon. Lord Lee of Fareham, G.B.E., K.C.B., formerly Minister of Agriculture, as his successor. Lord Lee's first public function in his new office was to unveil, in the entrance hall of the old Admiralty building in Whitehall, on 26th February, a memorial to members of the Civil Staff of the Department who fell during the War. This tablet commemorates the services of 110 men who laid down their lives. The number, said Lord Lee, was large, but would have been much larger had it been possible to release all those who desired to serve overseas. It was not found possible, however, to spare more than 740, of whom 110 made the great sacrifice. On 21st March Lord Lee went on board the "Queen Elizabeth" and witnessed the practice exercises in the Channel of the Atlantic Fleet, then returning from its Spring cruise. He afterwards left Portsmouth in the "Enchantress," on 25th March, for Portland and other naval bases on a cruise of inspection.

In Admiralty orders dated 19th February appeared the following farewell message from Mr. Walter Long (First Lord of the Admiralty): "I cannot sever my connection with the Royal Navy without saying how profoundly I have been struck by the loyalty, efficiency, and keenness of all ranks of our great Service. I would like to convey to the flag officers, officers, and ships' companies the pride I feel at having for a short time been at the head, when First Lord, of His Majesty's Admiralty, and how confident I am that should the Royal Navy be ever called upon to perform duties to the State, however severe and difficult they may be, they will not be called upon in vain. Good luck to the Royal Navy, and I am afraid it must be good-bye."

At the end of March changes were made in the offices of Civil Lord and Parliamentary and Financial Secretary. The former post had been held since 1st November, 1920, by the Earl of Lytton, but in view of the appointment of a Peer as First Lord it was felt desirable to have the other two Parliamentary members of the Board in the House of Commons. Consequently, Lord Onslow was transferred to the post of Parliamentary Secretary to the Ministry of Agriculture, and a few days later to that of Parliamentary Secretary to the Ministry of Health. In his place it was officially announced on 2nd April that Commander B. M. Eyres-Monsell, R.N., M.P., had been appointed Civil Lord. This officer served on the active list of the Navy from July, 1895, to July, 1906, when he resigned his commission as lieutenant and was placed on the Emergency List. In the War he saw active service at Gallipoli and in Egypt, and commanded H.M. monitor No. 21 and the river gunboat "Glowworm." It was also announced on 2nd April that in the vacancy caused by the retirement of Sir James Craig in order to become Leader of the Northern Parliament of Ireland, Lieutenant-Colonel L. C. M. S. Amery, formerly Under-Secretary of State for the Colonies, had been appointed Parliamentary and Financial Secretary to the Admiralty.

Naval Commands and Appointments.

The changes foreshadowed last quarter in the Naval Commands at the Nore, where Admiral Sir Hugh Evan-Thomas succeeded Admiral Sir Doveton Sturdee on 1st March, and at Queenstown, where Vice-Admiral Sir Ernest Gaunt succeeded Admiral Sir Reginald Tupper on 1st April, were duly carried out. No other changes of Commanders-in-Chief were announced during the quarter, but several occurred among junior flag officers.

Three out of the four Rear-Admirals in the Reserve Fleet were relieved. On 27th January the Admiralty announced that Rear-Admiral W. J. S. Alderson had been selected to be Rear-Admiral in the Reserve Fleet at the Nore, in succession to Rear-Admiral V. H. G. Bernard, C.B., to date 17th March; and that Rear-Admiral C. D. Johnson, C.B., D.S.O., M.V.O., was to be Rear-Admiral in the Reserve Fleet at Devonport, in the place of Rear-Admiral Philip H. Colomb, to date 9th April. On 19th March the appointment of Rear-Admiral C. B. Miller, C.B., to be Rear-Admiral of the Rosyth Reserve, in succession to Rear-Admiral Crawford Maclachlan, C.B., was announced, with effect from 3rd May.

Five out of the nine flag officers in the Atlantic Fleet were also ordered to haul down their flags, in two cases without replacement. In pursuance of the reductions in the strength of the Fleet announced in the First Lord's Memorandum, the First and Second Battle Squadrons were ordered to be organized as one squadron, to be known as the First Battle Squadron, Atlantic Fleet, as from 3rd May, under the command of Vice-Admiral Sir William C. M. Nicholson, K.C.B., who, since 1st October, 1920, had been Vice-Admiral Commanding the Second Battle Squadron. His flag was to continue to be flown in the battleship "Barham." Vice-Admiral Sir Sydney R. Fremantle, K.C.B., M.V.O., on completing two years as Vice-Admiral Commanding the First Battle Squadron, with his flag in the "Revenge," was therefore directed to strike his flag on 3rd May.

Of the Rear-Admirals in the Battle Squadrons, Rear-Admiral H. M. Doughty, C.B., C.M.G., was directed to strike his flag as Rear-Admiral of the First Battle Squadron, in the "Resolution," on 14th April; and Rear-Admiral E. B. Kiddle, C.B., as Rear-Admiral of the Second Battle Squadron, in the "Valiant," on 8th April. As Rear-Admiral of the new First Battle Squadron, Rear-Admiral Sir Rudolf W. Bentinck, K.C.M.G., C.B., was appointed as from 3rd May to fly his flag in the "Revenge," and Rear-Admiral Hugh D. R. Watson, C.B., C.B.E., M.V.O., was selected to succeed him as Naval Secretary to the First Lord of the Admiralty.

Two changes also occurred in the cruiser squadrons of the Fleet. On 31st March, on completing two years in the Command, Rear-Admiral Sir Roger Keyes, K.C.B., K.C.V.O., C.M.G., D.S.O., was succeeded as Rear-Admiral Commanding the Battle-Cruiser Squadron by Rear-Admiral Sir Walter Cowan, K.C.B., D.S.O., M.V.O., with the "Hood" as his flagship. On 19th March the appointment was announced of Rear-Admiral Wilmot S. Nicholson, C.B., to be Rear-Admiral Commanding the Second Light Cruiser Squadron, in succession to Rear-Admiral A. A. M. Duff, C.B., to date 14th May, on which day Rear-Admiral Duff completed two years in the command.

On the Foreign Stations the only change was the reduction of the Rear-Admiral's Command in North American waters. On 4th March it was announced that orders had been issued by the Admiralty for the flag of Rear-Admiral Sir Allan F. Everett, K.C.M.G., K.C.V.O., C.B., to be struck in the light cruiser "Calcutta" on 8th April as Rear-Admiral Commanding the Eighth Light Cruiser Squadron. This force, reduced from four ships to three, then passed under the direct command of Vice-Admiral Sir William Pakenham, K.C.B., K.C.M.G., K.C.V.O., Commander-in-Chief on the North American Station.

There were six retirements from the Flag List during the quarter, all of rear-admirals. Rear-Admiral E. L. Booty, C.B., M.V.O., retired on 1st February, at his own request, thereby promoting Captain E. C. Hardy, formerly Assistant Hydrographer of the Navy, to Rear-Admiral. The new Rear-Admiral himself retired next day, promoting Captain A. C. H. Smith, C.B., M.V.O., A.D.C., to flag rank as from 2nd February. The next retirement was that of Rear-Admiral S. R. Drury-Lowe, C.M.G., who retired at his own request on 25th February. Captain B. H. Fanshawe, C.B.E., who was promoted to fill the vacancy, was placed on the retired list as from the next day, whereupon Captain Hugh L. P. Heard, D.S.O., was promoted to Rear-Admiral. On 8th March Rear-Admiral F. C. Learmonth, C.B., C.B.E., who holds the position of Hydrographer of the Navy, was placed on the retired list, at his own request, in order to facilitate the promotion of younger officers. Captain V. B. Molteno, C.B., A.D.C., the Head of the Auxiliary Patrol Section, was promoted to Rear-Admiral as from the same day, but on 9th March he, too, followed the example of Rear-Admiral Learmonth and retired voluntarily. Thereby, Captain E. K. Loring, C.B., A.D.C., was promoted to Rear-Admiral.

Navy Estimates, 1921-22.

The Navy Estimates for the financial year beginning on 1st April, 1921, were presented to Parliament on Monday, 14th March (No. 43), together with an Explanatory Statement by the First Lord of the Admiralty (White Paper Cmd. 1191). They showed a total proposed expenditure of £91,186,869 gross, and £82,479,000 net. The net Estimates for the previous year were £84,372,300, but a Supplementary Estimate presented on 8th December, 1920, for £6,500,000 increased this total to £90,872,300. In comparison, therefore, with the combined Estimates for 1920-21, those for the coming year show a reduction of £8,393,300. The total number of officers and men is given as 123,700, as compared with 136,000 in the previous year. This is made up of 98,047 officers and men for the Fleet, 3,250 for the Coastguard, 14,837 for the Royal Marines, 5,200 for naval cadets, recruiting officers, and boys under training; and 2,366 on miscellaneous services. The money votes are as follows:—

Wages of Officers, Seamen, and Boys, etc.	£18,314,000
Victualling and Clothing for the Navy	7,821,000
Medical Establishments and Services	720,500
Civilians Employed on Fleet Services	389,000
Educational Services, Colleges, etc.	465,500
Scientific Services, Observatories, etc.	449,000
Royal Naval Reserves and Sea Cadet Corps	580,600
Shipbuilding, Repairs, Maintenance, etc.:—	
Section I—Dockyard Personnel	11,618,600
Section II—Material and Fuel	11,896,500
Section III—Contract Shipbuilding	6,270,200
Naval Armaments, Cordite Supplies, etc.	6,726,000
Works, Buildings and Docks	5,836,600
Miscellaneous Effective Services	2,725,000
Admiralty Office and Staff	1,752,800
Half Pay and Retired Pay	2,093,500
Pensions, Gratuities and Allowances	4,003,500
Civil Superannuation and Gratuities	816,700
Total	£82,479,000

The customary statement of contributions to naval funds shows that the Government of India supplies £100,000 per annum towards the maintenance of H.M. ships in Indian waters, and £3,400 on account of work performed by the Admiralty in regard to the Indian Troop Service. The arrangement with India is under revision, but pending a settlement provision is made for the same contribution as hitherto. For their share of liability for retired pay of officers and pensions of men lent from the Royal Navy, India, Canada, Australia, and New Zealand contribute in the aggregate a sum of £31,500; but the only Dominion which contributes anything towards the general maintenance of the Royal Navy is the Union of South Africa, which supplies a sum of £85,000. For the maintenance of a branch of the Royal Naval Reserve, Newfoundland contributes £1,000.

The First Lord's Memorandum.

In the course of his Explanatory Statement, Lord Lee of Fareham makes the following observations:—

"In my predecessor's explanatory statement of last year a comparison was made with the Estimates for 1914-15. Without repeating the same details, I may mention that the gross estimate of £91,186,869 for 1921-22, which includes 3¼ millions for completion of ships in hand and 2½ millions for commencing the replacement of obsolescent ships, corresponds (after the necessary deductions have been made for non-recurrent war liabilities and increases in prices, wages, pensions, etc.) with a pre-war figure of about £34,500,000 (gross). The actual figures in 1914-15 were £53,573,261 (gross). There is consequently a comparative decrease of over 19 millions in the present Estimates, as compared with 1914-15.

"Estimates can only be based upon policy, and the naval policy of the Government, as announced by my predecessor, in the House of Commons, on 17th March, 1920, is to maintain a 'One-Power Standard'—i.e., that our Navy should not be inferior in strength to that of any other Power. The duty of the Admiralty is to carry out that policy, as economically as possible, giving full weight to the special geographical, international, and other considerations which have arisen since the War. This they are doing—in no mechanical spirit nor with insistence upon 'numerical equality'—and, recognizing to the full the necessity for reducing expenditure to the lowest limits compatible with national security, the Admiralty have effected drastic economies, and agreed to assume risks which, in ordinary circumstances, they would regard as difficult to reconcile with the full maintenance of the Government's declared policy.

"The details of these economies will be apparent in the Votes; but it may be here mentioned that they include:—(*a*) The reduction of the number of capital ships in full commission from 20 to 16 (as compared with 38 in March, 1914). This is the smallest number that will enable the essential seagoing and technical training of officers and men to be properly carried out. (*b*) The placing in reserve of one of the four destroyer flotillas of the Atlantic Fleet. (*c*) The reduction of the North American and South African Squadrons by one light cruiser each, and the complete (temporary) withdrawal of the South American Squadron. (*d*) The reduction of the personnel of the Fleet during 1921 to 121,700 officers and men (as compared with 127,500 in 1920 and 151,000 in 1914). (*e*) The reduction of Civil Staffs at the Admiralty and other establishments, and other economies in the dockyards.

"These changes are dictated, almost entirely, by the pressing need for economy, and make it incumbent upon the Admiralty to maintain the reduced Navy in a state of the highest possible efficiency. In pursuance of this policy, the retention in reserve of the eight battleships ('Hercules,' 'Colossus,' 'Neptune,' 'St. Vincent,' 'Collingwood,' 'Temeraire,' 'Bellerophon,' and 'Superb'), which

are armed with 12-in. guns, is no longer considered justifiable, and they are transferred to the Disposal List. The number of capital ships on the effective list is thus reduced to 30 (including H.M.A.S. 'Australia'), of which 14 will be in reserve. Of these 30 ships, the older types are becoming obsolescent, and cannot be reckoned as efficient fighting units for more than a few years longer. The need for their gradual replacement by modern ships, embodying the lessons of the War, can therefore no longer be disregarded. In this connection it must be remembered that no capital ship for the Royal Navy has been laid down and completed since 1916, and it is obvious that, as the Fleet is reduced in numbers, the ships of which it is composed must be of up-to-date type and of the highest efficiency. A sum of 2½ millions has therefore been included in these Estimates as a first instalment for 'replacement' ships. Further details of the proposed expenditure will be laid before Parliament as soon as possible.

"It cannot be too strongly emphasized that, in making this long-delayed beginning with the replacement of obsolete ships, the Government neither commits itself to, nor contemplates, any building 'Programmes' in answer to those of any other Power. Indeed, it trusts that it may be possible, as a result of frank and friendly discussion with the principal Naval Powers, to avoid anything approaching to competitive building, either now or in the future. But meanwhile it would be a dereliction of duty on the part of the Admiralty to allow the efficiency, training, or *moral* of the Royal Navy to deteriorate through neglect to provide it with *matériel* which is equal to the best and in which it can feel confidence. It is also imperative to avoid an irrevocable loss of time and building facilities which might make it impossible to maintain our sea security if it should be threatened. It is upon this basis of policy, and with a full realization of the vital need for economy, that these Estimates have been framed."

The Navy Estimates were introduced in Parliament on 7th March by Sir James Craig, who announced that the Admiralty proposed to close the dockyards at Haulbowline and Pembroke, these being the yards least adequately equipped to meet modern naval requirements. This is the last year in which war liabilities will appear in the Navy Estimates. The return to their owners of the large number of hired vessels taken up for naval service during the War is almost complete. After referring to the closing of Osborne College, the Parliamentary Secretary described the restarting of the Royal Naval Reserves on a peace footing. Recruiting for the R.N.V.R. had just begun, he said, and that for the R.N.R. was to begin on 1st April. The Naval Staff had been brought down to post-war requirements, and now consisted of eight divisions, with a total personnel of 86. The importance attached to scientific research was shown by the fact that it provided one instance of the few increases in the new Estimates. Research work was to begin at the new Naval Research Institute at Teddington in April.

Turning to new shipbuilding for the replacement of obsolescent vessels, Sir James Craig said that the four new ships would be an improvement on the "Hood" class, embodying the lessons of the War. A submarine and a minelayer were also to be built, both embodying the latest developments and also a number of experimental features.

NAVAL OCCURRENCES.

VACANCIES FOR EX-SEAMEN.—By an Admiralty order of 1st January, special service seamen now serving in the R.F.R. may, if they wish, re-enter under engagements for either two, three, four, five or seven years. Article 118, R.F.R. Regulations, Clause I, which debars special service men, and those discharged free or on reduced terms to join the Reserve, from rejoining the Navy, except in special cases, has been suspended until further orders.

BOYS IN REFORMATORY SCHOOL SHIPS.—The Admiral of the Training Service has, since 1st January, become responsible for making an annual inspection of reformatory nautical schools, including the "Cornwall," the Farnworth Nautical School, and the Heswall Nautical School. Entry into the Royal Navy of boys from reformatory schools is prohibited, and no relaxation of this rule is to be permitted. The A.T.S. acts in an advisory capacity only.

THE BALTIC S.N.O.—On 1st January the Admiralty announced that the Rear-Admiral Commanding the First Light Cruiser Squadron had ceased to be the Senior Naval Officer in the Baltic since 15th December. Correspondence relating to matters in the Baltic was ordered to be addressed, "Senior Naval Officer, Baltic, c/o G.P.O.," a copy being sent for information to the flag officer of the squadron from which the S.N.O.'s ship is detached. The Baltic records will be retained in the S.N.O.'s ship, which at the beginning of the year was the "Dauntless," this vessel being afterwards relieved by the "Castor."

COASTGUARD CHANGES.—Several changes in coastguard organization occurred during the quarter. The headquarters of the Divisional Officer of the Berwick Division have been transferred to Blyth, formerly the base of the 4th Submarine Flotilla, Atlantic Fleet, and the Division has been renamed Blyth Division. From 1st January also the headquarters of the D.O. at Sunderland were transferred to Tynemouth, and the Division renamed Tynemouth Division; while a similar change, made shortly afterwards, was the transfer of the Lynn Division headquarters to Boston. From 15th May the headquarters of the D.O., Whitby Division, were ordered to be transferred to Coatham, and the Division renamed Tees Division. On 23rd March the following stations were ordered to be closed: Hessle, Barton-on-Humber, Banklands, Thornham, and Leigh (in the Nore Command); Southsea, Ryde, Millbrook, Eling, Marchwood, and Crowlink (Portsmouth Command); and Stonehouse, Shaldon, and Porthallow (Plymouth Command). The date for closing Southsea Station was 15th April, and Leigh, 24th June.

PRINCE GEORGE'S APPOINTMENT.—On passing out of the training ship "Temeraire," Prince George, the fourth son of their Majesties, was rated a midshipman in the Navy on 15th January. In the "Naval Appointments" issued by the Admiralty on 30th December, he was ordered to join H.M.S. "Iron Duke," flagship of the Commander-in-Chief in the Mediterranean, as from 15th January, in company with eight other midshipmen. His Royal Highness took passage to Malta in the aircraft carrier "Vindictive," which left Portsmouth on 24th January, with relief crews for Mediterranean ships, arriving at Malta on 7th February. There he temporarily joined the battleship "Ajax," flying Admiral de Robeck's flag in the absence of the "Iron Duke," and in the former ship made a cruise to the Levant.

TRAWLER SCHEME ABANDONED.—On 10th January it was announced that the scheme promoted by the Government to enable fishermen who had been engaged in mine-sweeping to purchase steam trawlers had been abandoned owing to the lack of interest and support on the part of the men. The Minesweepers' Co-operative Trawling Society, Ltd., was registered on 13th August, 1920, and at the first meeting in connection with the movement, held at Grimsby on 23rd August, messages from the Prime Minister and Lord Beatty were read by Dr. Macnamara, Minister of Labour, who explained the scheme, a resolution in favour of which was carried. By the end of the year, however, the necessary working capital of about £100,000 had not been subscribed, and the Society was therefore wound up. It was stated in the press that distrust of the Government on the part of the fishermen was chiefly responsible. Although the Stationery Office, by Cabinet instructions, sent out a large number of prospectuses, hundreds were never opened, as the

fishermen, as soon as they saw the official seal on them, destroyed both envelope and contents.

ATLANTIC FLEET'S CRUISE.—The Atlantic Fleet, under Admiral Sir Charles Madden, G.C.B., G.C.V.O., K.C.M.G., LL.D., left Portland on 17th January for its Spring cruise to the coast of Spain and Gibraltar, and was absent from home waters until 21st March. The forces taking part were the First and Second Battle Squadrons, the Battle-Cruiser Squadron, the "Coventry," and the Third and Fourth Destroyer Flotillas, the Second Submarine Flotilla, and the "Argus," aircraft carrier, "Greenwich," destroyer depot ship, and "Assistance," fleet repair ship. The places visited included Arosa Bay, Corunna, Vigo, and Gibraltar, the ships leaving the last named on 17th March for England, where Spring leave was to have been granted from 23rd March to 23rd April had not the industrial crisis arising out of the coal strike intervened.

LOSS OF A SUBMARINE.—On Thursday, 20th January, submarine "K.5," of the First Flotilla, Atlantic Fleet, was lost with all hands in latitude 48 deg. 51 min. North, longitude 9 deg. 05 min. West, or about 120 miles south-west of the Scilly Isles. She was commanded by Lieutenant-Commander John A. Gaimes, D.S.O., and had on board at the time a total of 6 officers and 51 men. An expression of sympathy to the relatives of the crew was sent by King George, and among other telegrams of condolence received at the Admiralty were those from the King of Norway and Admiral Baron Kato, the Japanese Naval Minister.

Mishap during Exercises.—At the time of the accident the submarines attached to the Atlantic Fleet were practising an attack on the capital ships. The "K.5" dived at 11.30 a.m. at a normal angle and without difficulty. She was seen on the surface at 11.44 a.m., and dived again at once. She was never seen afterwards. There was at the time no reason to suppose that she was in difficulties. Shortly after 2 o'clock she was called, but did not answer her call-sign. Search was accordingly instituted by the parent ship "Inconstant" and other submarines, and at 5.42 p.m., approximately 1½ mile from the diving position, a large patch of oil and some wreckage were discovered, the latter being identified as belonging to "K.5." The "Inconstant" and some destroyers sent by the Commander-in-Chief remained in the position all night, but found no bodies.

Report on the Loss.—On 3rd February the Admiralty made a statement in which it was shown that the actual cause of the loss of submarine "K.5" cannot be ascertained in the absence of any survivors, and no blame can be attributed to anyone in the matter. It is established from the evidence that she was not sunk by collision with any other vessel. The wreckage picked up furnishes no evidence as to the cause of the accident, which remains a matter of conjecture. Some loss of trim or of control may have occurred while submerged, which caused the vessel to reach a depth at which the external pressure would become too great, and destruction would quickly follow. The great size of the K submarines naturally makes their management when diving more difficult than in the case of smaller submarines. This is one of the chief technical problems that have to be solved in increasing the size of submarines. K class submarines have frequently dived in deep water. The evidence of the commanding officers of the other submarines in company with "K.5" indicates that there was nothing in the weather conditions to make diving a matter of any unusual risk. "K.5" had undergone an ordinary periodical refit in December, 1920, and had since exercised both afloat and submerged. Her Commanding Officer had expressed himself satisfied with the vessel and the training of the crew.

Memorial Service.—On the afternoon of Sunday, 20th March, as it was returning from its Spring cruise, the Atlantic Fleet held a memorial service over the spot where "K.5" was lost, some 14,000 officers and men taking part. The arrangements were made by Vice-Admiral Sir Sydney Fremantle, who, in the absence of the Commander-in-Chief in the "Queen Elizabeth," was in command of the Fleet, consisting of 6 battleships, 2 battle cruisers, 6 light cruisers, 17 destroyers of the Third Flotilla, and the aircraft carrier "Argus." After the service the customary three volleys were fired by a party of 100 seamen in the flagship "Revenge," and the "Last Post" was sounded.

Dockyard Short Time.—From Sunday, 23rd January, short time was enforced in the Royal dockyards to the extent of seven hours per week to find employment for more men than would otherwise be possible, wages being reduced accordingly. Instead of the forty-seven-hour week previously in operation, the men were ordered to work eight hours a day for five days of the week, leaving off from Friday night until Monday morning. In the First Lord's Memorandum accompanying the Estimates, dated 12th March, it was stated that 56,000 men were then employed in the dockyards, of whom 51,000 were employed on purely naval work, including 5,000 entered temporarily under the "short-time" policy, and 5,000 on repayment work largely as a result of the Colwyn Committee. The money taken in Vote 8, Section I, admits of the continuous employment of only 43,000 "full-time" men on naval work. As regards work on which "short-time" labour can economically be employed, this is fast coming to an end, said the First Lord, and the gradual discharge of the surplus men specially taken on cannot therefore be avoided.

Cadets' Training Ships.—Early in February the Admiralty decided to pay off the battleship "Temeraire," training ship for Osborne cadets, and the cruiser "Carnarvon," training ship for public school cadets, and to combine their work in the battleship "Thunderer," then in reserve at Portland. The "Thunderer" was ordered to Rosyth to refit and be ready for her new duties in May. Amendments were made in the programmes of the cruises of the "Temeraire" and "Carnarvon" so that the former should arrive at Rosyth on 17th April, and the latter at Sheerness on 15th April. They had both been employed on training duties since 1919, when the "Temeraire" took over the work formerly carried out by the "Cornwall" and "Cumberland," and the "Carnarvon" embarked from Keyham College public school cadets, who before the War went to sea in the "Highflyer."

Conference at Penang.—A meeting of the Admirals of the China, East Indies, and Australian Stations, such as used to be held annually before the War at Singapore, took place at Penang early in March. Those taking part were Vice-Admiral Sir Alexander Duff (China), who arrived in his flagship the "Hawkins" on 9th March from Hong Kong and Singapore; Rear-Admiral Sir Hugh Tothill (East Indies), who arrived on 7th March from Madras in the light cruiser "Caroline"; and Rear-Admiral Sir E. Percy Grant, First Naval Member of the Commonwealth Navy Board, who hoisted his flag in the Australian light cruiser "Brisbane," and leaving Fremantle on 22nd February arrived at Penang on 6th March. The meeting there terminated on the 13th.

Marriage Allowances Reduced.—A reduction in the rates of allowances for the wives and children of married men in the Royal Navy and Royal Marines was announced in Admiralty Orders dated 5th February, to come into force on 1st April. The Admiralty stated that as the Ministry of Labour index figure of the cost of living for 1st January, 1921, was 165, the rates of marriage allowance to be paid

for the year April, 1921, to March, 1922, will be those shown under the index figure 160 in the sliding scale published when marriage allowance was instituted in July, 1920.

R.N.V.R. Drillships.—On 10th February the sloop "Saxifrage" arrived at Pembroke Dockyard to be refitted at a cost of £25,429 as a drillship for the London Division of the Royal Naval Volunteer Reserve at Blackfriars instead of the "President." She will be renamed "President," and the vessel hitherto so called will revert to her former name of "Buzzard." The minesweeper "Sir Hugo" and small monitor "M.23" are also to be refitted at Sheerness as R.N.V.R. drillships at a cost of £25,484 and £15,088 respectively.

Jutland Prize Bounty.—On 16th February the Admiralty published details of the award of Prize Bounty granted for the destruction of German vessels at the Battle of Jutland. The awards to captains in command were, for the first eighty on the list, £8 4s. 3d.; for the second eighty, £6 13s. 6d.; and for the remainder, £5 2s. 8d. The awards in the lower classes, numbered 1 to 13 in the schedule, varied from £3 1s. 7d. to 2s. The Admiralty pointed out that the large number of officers and men engaged only admitted of a very small unit of distribution.

Promotion Zones.—A reduction of the limits of the promotion zones for deck officers whose advancement is by selection was announced on 23rd February. In the last half-yearly promotions, made on 1st January, the new captains were chosen from commanders of from four and a half to eight years' seniority inclusive, and the new commanders from lieutenant-commanders of from two to six and a half years. In the selection in June, 1921, the zones will include commanders of from five to eight years, and lieutenant-commanders of from three to six and a half years. In December, 1921, there will be a further curtailment of the commanders' zone, which will be from five and a half to eight years, that for lieutenant-commanders remaining as in June. The upper limits of the zones being all unchanged, the effect of the order was to cause officers to serve for a longer minimum time in their old ranks before becoming eligible, in the ordinary course, for promotion.

Fewer Steam Trials.—In view of the urgent need for economy, the Admiralty decided in February, as a temporary measure, that steam trials as laid down in Article 442 of the Steam Manual shall be run half-yearly instead of quarterly. The Board consider it of the greatest importance, however, that this reduced number of trials shall be carried out, and in all cases where it is not possible to run a trial during the half-year the reason is to be reported by letter.

Duration of Appointments.—By an order of 2nd March all appointments of commanders and lieutenant-commanders were to be for two years only, whether ashore or afloat, at home or abroad. An extension of one year will be considered if it can be shown that such is necessary in the interests of the Service or that personal hardship would otherwise be caused, but this extension is confined to appointments as King's Harbour Masters (not Assistants), to officers in charge of detention barracks, and superintendents or assistant-superintendents in the Hydrographic and Compass Departments. Appointments of naval attachés will, as formerly, be "during pleasure."

Armlets for Staff Officers.—From 9th March armlets were to be worn by all staff officers in the Royal Marines instead of gorget patches, which were abolished for all officers below the rank of colonel-second-commandant. The armlets were to be red, white, and red for officers employed at the Admiralty; red for those on the staffs of commanders-in-chief and senior naval officers; and blue for

brigade majors at the Royal Marine Divisions and the Depot at Deal. Details of the devices and lettering to be worn on the armlets were also published in the order.

THE NAVAL RESERVES.—On 12th March a revised scheme for the Royal Naval Reserve and Royal Naval Volunteer Reserve was published. The R.N.R. will consist of chief petty officers, petty officers, leading seamen, leading stokers, seamen, and stokers, and will be organized for men for fleet service, patrol service, and shore and harbour services. The maximum period of service will be twenty-five years, and the annual retainers will be increased to £12 for C.P.O.'s and P.O.'s, £10 for leading rates, and £8 for other ratings. In the R.N.V.R., enrolment will be for four years, during which every rating will do forty-two days' training, including fourteen days at sea.

NAVAL ARCHITECTS' MEETING.—On 16th March the annual meetings of the Institution of Naval Architects opened at the Royal United Service Institution, and at the annual dinner held the same evening Lord Lee made his first public speech on naval policy since becoming First Lord. After showing how we have admittedly taken risks as regards the relative position of our Navy, he said we are prepared to go as far as possible in that direction by mutual agreement, and suggested a "business talk" with the United States which might lead up to "a square deal." At the main sessions of the Naval Architects' meeting, papers were read by Sir Eustace d'Eyncourt on features of German warship construction, Mr. S. V. Goodall on the battleship "Baden," and Mr. W. R. G. Whiting on the strength of submarine vessels.

STRAW HATS ABOLISHED.—By Admiralty Order No. 664, dated 16th March, the sennet or straw hat was removed from the regulation kits of petty officers, men, and boys dressed as seamen. At home, the uniform cap was ordered to be worn according to season, i.e., blue in winter and white in summer, on the occasions on which the sennet hat had previously been worn; and sun helmets were to be supplied to men serving in ships and establishments on foreign stations. The sennet hat had been a part of the sailor's uniform ever since the latter was established in 1857, and for many years before had been included in the unofficial or irregular dress of the seamen.

EX-GERMAN DOCKS.—Under the Protocol of 10th January, 1920, eleven floating docks, tugs, and the like were surrendered to the Allies and allocated to Great Britain. These have been disposed of as follows: Three 40,000-ton floating docks (one sectional), the 1,800-ton dredger "Severn," and two floating cranes, of 1,600 and 156 tons, were reserved for Admiralty purposes; the 228-ton tug "Posadowski" was allocated to the Government of Nigeria; one 46,000-ton floating dock was to be sold; and the fate of one small 600-ton floating dock, and of the tugs "Helga" and "Kraft" was not, for the present, decided.

DOMINION NAVIES.—In January the appointment was confirmed, as Director of the Naval Service of Canada, of Captain Walter Hose, C.B.E., R.N., who had been acting Director since March, 1920, when the retirement of Admiral Sir Charles Kingsmill was first announced. Captain Hose had been serving under the Canadian Government since June, 1911. On 25th March it was announced that a Naval Board, similar to the Commonwealth Naval Board at Melbourne, had been created by the New Zealand Government to administer the affairs of the New Zealand Naval Force. The Minister of Defence is President, Commodore Alan G. Hotham, who took out the "Chatham" last autumn, is the senior naval member, and the other members are his Chief of Staff, Captain T. A. Williams, C.B.E., who is a New Zealander by birth; and Secretary, Paymaster-Commander John Siddalls, O.B.E.

RESEARCH STATION CLOSED.—On 31st March the Admiralty Experimental Station at Shandon, Dumbartonshire, was closed down. It was set up during the War with the primary object of investigating methods for counteracting the enemy's submarine warfare. The appointment of Senior Naval Officer, Shandon, held since 1919 by Captain George L. Massey, who in the War was Assistant-Director of Paravanes, was terminated on 31st March, and from this date research work for the Navy was to be chiefly carried on at the Naval Research Institute at Teddington, in close proximity to the National Physical Laboratory.

FOREIGN NAVIES.

FRANCE.

BLACK SEA ACTION.—On 12th January a Constantinople report stated that the destroyer "Sakalave," whilst on patrol duty in the Black Sea to prevent the smuggling of arms, was fired on near Novorossisk by a Bolshevist vessel. The destroyer returned the fire, and the hostile vessel was struck and forced to run ashore.

THE NAVAL BUDGET.—According to the *Moniteur de la Flotte*, the French Naval Budget for 1921 has been submitted to a very strict scrutiny such as has never been given to any previous budget. The demand was for 1,349,514,129 francs (or £53,980,565, at the normal rate of exchange) for the ordinary budget, and 168,786,149 francs (£6,751,445) for the extraordinary outlays, a total of £60,732,010. The various reductions which have been made have left 961,788,551 francs (£38,471,540) for the ordinary budget and 122,055,195 francs (£4,882,210) for the extraordinary outlays, a total of £43,353,750. The latter figures are being submitted for the approval of the French Parliament. The reductions in the original figures correspond with a prospective decrease in the Paris staff of the Navy, in food and clothing, in the price of fuel, in the number of working men in the arsenals, and in the orders for ships and guns to private yards and works.

ITALY.

BATTLESHIP SALVED.—On 24th January the final operation for salving the battleship "Leonardo da Vinci," which sank keel uppermost after an explosion on 3rd August, 1916, was successfully accomplished at Taranto. Divers excavated a space round the ship, holes in her were cemented, and a mile-long trench was dug along which she was drawn to a dock. She was then towed out to open water, where, by flooding certain compartments, she was enabled to right herself by natural means, the exploit constituting a triumph for Italian naval engineering skill.

NAVAL PROGRAMME.—On 4th February a Rome message stated that the following new ships would be found to be included in a new naval programme: Eight minelayers, 8,000 tons each; one oil tank steamer, 7,000 tons; fifty-four submarines, 600 tons each; two scouts, 900 tons each; and four destroyers, also of 900 tons. The programme is also to provide for the construction of the following units ordered during the war: Three scouts of 2,200 tons; five destroyers of 800 tons; and eight of 900 tons; six gunboats of 250 tons; one river gunboat; and several auxiliary vessels.

JAPAN.

FLYING INSTRUCTORS.—Questioned on 23rd March about the reported despatch of a mission of British airmen to join the Japanese Navy, the Secretary of State for Air said it was understood that a certain number of civilians had been engaged by

the Japanese as flying instructors, but no mission had been sent by the Royal Air Force, nor had the civilians in question been sent for courses to R.A.F. Stations in England. The British Government have neither sold nor sent to Japan any aeroplanes or aero engines, but it is possible that the Aircraft Disposal Company, in which the Government have retained an interest, may have sold certain obsolete or surplus engines to that country.

NAVAL STRENGTH.—Sir James Craig, on 16th March, gave the following information about the Japanese Navy: Twelve battleships, excluding one attached to the Gunnery School, are at present maintained in full commission, and six battle-cruisers, excluding one attached to the Torpedo School. The numbers borne on 19th January, 1921, were 76,600, made up of approximately 7,000 officers and 69,600 men, all of whom were available for manning. The corresponding figure in 1914 was 55,712.

UNITED STATES.

"COLORADO" LAUNCHED.—The battleship "Colorado," the second of the capital ships of the 1916 programme to be launched, took the water at Camden, New Jersey, on 22nd March. Her chief characteristics as given by the "Army and Naval Journal" are: Length overall, 624 feet; maximum beam, 97 feet 5½ inches; mean draft, 30 feet 6 inches; displacement, 32,600 tons; speed, 21 knots; battery eight 16-inch guns, fourteen 5-inch guns, four 3-inch anti-aircraft guns, and two submerged torpedo tubes; enlisted complement of 1,448. This vessel has the large cruising radius which characterizes all recent U.S. battleships. Among the new features incorporated in her construction is special protection given against submarine attack, the result of departmental tests and lessons learned in the war. The "Colorado" and her sister ships are believed to be as nearly immune from torpedo attacks as any ships afloat. The boilers are fitted for burning oil exclusively. The main propelling machinery, which is electric as in the case of all the capital ships now under construction for the U.S. Navy, consists of two main generators driving four propelling motors. The main generators are of the turbine type, designed to develop a total of about 29,000 indicated horse-power, and were built by the Westinghouse Electric Company.

"MILWAUKEE" LAUNCHED.—The scout cruiser "Milwaukee," No. 5 of the class of ten building under the 1916 programme, and the second to be launched, was put afloat on 24th March at Tacoma, Washington, by the Todd Company.

NEW OFFICIALS.—Mr. Harding, the President-Elect, announced on 26th February that Mr. Edwin Denby, of Detroit, had accepted the post of Secretary of the Navy, and Colonel Theodore Roosevelt, son of the late President, that of Assistant-Secretary. Colonel Roosevelt thus follows in the footsteps of his father, whose first venture in federal politics was as Assistant-Secretary of the Navy in 1897.

DESTROYER SUNK.—The destroyer "Woolsey" was sunk thirteen miles off Coiba Island on the morning of 26th February after collision with the merchant ship "Steel Inventor," of Portland, Oregon, bound for Philadelphia. Sixteen men were reported to be dead or missing.

PRESENT STRENGTH.—In reply to questions on 16th March, Sir James Craig said that sixteen battleships, including three temporarily in reduced commission owing to personnel shortage, were maintained in full commission at present by the United States. The numbers of the personnel to be voted for 1921-22 had not yet been finally approved, but will probably be the same as last year, viz., 150,800, made up of 120,000 enlisted men, 9,800 officers, 1,000 Marine officers, and 20,000 Marine rank and file. All these were available for manning.

MILITARY NOTES.

JANUARY—MARCH, 1921.

GREAT BRITAIN AND IRELAND.

Martial Law in Ireland.—On 4th January martial law was extended to the following areas in Ireland: The counties of Clare, Kilkenny, Waterford and Wexford, and the city of Waterford. The areas in which martial law had been already proclaimed were the counties of Cork, Kerry, Limerick, and Tipperary, and the cities of Cork and Limerick.

Hygiene in the Army.—6th January. An Army Order announced that Command Schools of Hygiene are to be established at Aldershot (when the transfer of the school at Blackpool is effected); Hertford Barracks, Hertford; Strensall Camp, near York; Dreghorn Camp, near Edinburgh; Hilsea Hutments, Portsmouth; and Carrickfergus.

Army Reserve of Officers.—On the same date an Army Order provided for the reorganization of the Regular Army Reserve of Officers into two classes: the first comprising officers who are fit for general service and who, in the event of a national emergency, will be the first to be called up; the second comprising all other officers.

Class 1. Maximum ages for appointment:—

Second-Lieutenant and Lieutenant	30
Captain	35
Major	40
Lieut.-Colonel	45

Class 2 (mainly for service at home or garrison duty abroad). Maximum ages for appointment:—

Second-Lieutenant and Lieutenant	40
Captain and Major	45
Lieut.-Colonel	50

Officers' Widows' Pensions.—By Royal Warrant (dated 30th December, 1920) the ordinary pensions granted to the widows and children of officers and warrant officers in the Army who died on or after 17th August, 1920, is increased to the following rates:—

	£	s.	d.
Second-Lieutenant or Lieutenant's widow	45	0	0
Major-General's widow	150	0	0
Lieut.-General's widow	187	10	0
General's widow	225	0	0
Field-Marshal's widow	300	0	0

Under the Royal Warrant of December, 1914, the rates were:—

Second-Lieutenant or Lieutenant's widow	40	0	0
General Officer's or Field-Marshal's widow	120	0	0

The ordinary rate of compassionate allowance will now be, irrespective of rank, per annum, £16; and if the children are motherless, £25. Previously this

allowance ranged from £10 for the children of a Subaltern to £20 for those of a General Officer. The pension of a Warrant Officer is increased from £20 to £30, and for children from £5 to £10 a year.

Army Dental Corps.—In January a Royal Warrant authorized the formation of a corps to be entitled the Army Dental Corps. This will be administered by the Director-General, Army Medical Service.

Officers' Swords.—From 1st April, 1921, swords will be worn by all officers of the Regular Army, except those holding temporary commissions, under the conditions obtaining before the War.

Roumanian Standard.—On 2nd February the Standard presented by the Roumanian Army to the British Army was handed over at the Royal Hospital, Chelsea. A Guard of Honour, provided by the Coldstream Guards, escorted the Standard from the Roumanian Legation to the Royal Hospital, where it was handed over by Colonel Ivan Paun, of the Roumanian Army, to General the Hon. Sir Neville Lyttelton, G.C.B., G.C.V.O., Governor of the Hospital.

Rewards to General Officers.—During February an Army Order dealing with rewards which may be granted to General Officers for distinguished and meritorious service provided that the limit of the total sum drawn in respect of such rewards, concurrently with retired pay, will be raised from £750 to £1,050 per annum, as from 24th January, 1920.

Ex-Soldiers for Ireland.—Also in February an Army Order stated that it had been decided to allow a limited number of discharged soldiers and reservists of Section I, Army Reserve, resident in Ireland, to re-enlist or rejoin the Colours for six months for service with any infantry battalion stationed in the Irish Command, provided that their services are so long required. The number of men to be posted under this order will not exceed twenty for any one battalion.

Cost of Armies in Mesopotamia, Palestine and Constantinople.—On 17th February it was announced in the House of Commons that the estimated monthly cost of these three Armies on that date were: Mesopotamia, £2,300,000; Palestine, £500,000; Constantinople, £225,000.

Forfeited Medals.—On 19th February it was announced that the Army Council had decided to restore all D.C.M.'s, M.M.'s, M.S.M.'s, and war medals which have been forfeited by soldiers since 4th August, 1914, except in those cases where a court-martial sentence of death or discharge from the Army has been carried out. Gratuities attached to medals, if not already paid, will be paid on their restoration, and pensions attached to medals will be restored.

R.A.M.C. Roll of Honour.—Early in March the official roll of the officers of the R.A.M.C. who laid down their lives in the War was published. The total number is 709, divided as follows:—

Old and New Armies.—Major-General, 1; Colonels, 8; Lieut.-Colonels, 17; Majors, 25; Captains, 360; Lieutenants, 185; total, 596.

Territorial Force.—Colonels, 2; Lieut.-Colonels, 13; Majors, 16; Captains, 77; Lieutenants, 5; total, 113.

The list includes 4 V.C.'s and 23 D.S.O.'s.

Army Estimates.—On the 11th March the Army Estimates were published. The main figures are as follow:—

	1921-22.	1920-21.
Total strength (excluding India)	341,000	525,000
Net total estimate	£106,315,000	£164,750,000

On the 16th March the War Secretary announced in the House of Commons that among other economies would be the disbandment of four Regular Cavalry Regiments, viz., 5th Lancers, 19th Hussars, 20th Hussars, and 21st Lancers; and the disbandment or conversion into other arms of 44 Yeomanry Regiments.

India.

Indian Army Reductions.—On 23rd January it was announced from Delhi that special units of the Indian Army were to be formed into units for service overseas —to be maintained at Imperial expense.

In the meantime the 39 Regiments of Indian Cavalry are being reformed into 21 by a process of amalgamation. After the completion of this scheme 35 infantry battalions are to be demobilized.

Courts-Martial in India.—The following officers in India were, during February, constituted "Superior Military Authorities" for purposes of the statutory power given to the confirming authority to suspend sentences passed by courts-martial until the orders of a Superior Military Authority have been obtained:—Commander-in-Chief, India; General Officers Commanding-in-Chief, Commands; General Officers Commanding Districts, Divisions, and Independent Brigade Areas.

North-West Frontier.—On 4th March road protection troops were ambushed in Hinni Tangi incurring casualties. On the 6th, near Sarwekai, a party about 100 strong attacked road protection troops but were repulsed. On the 5th, in Zhob, enemy estimated at 50 to 70 strong attacked Gurkhas escorting a convoy between Mir Ali Khan and Moghal Kot—our casualties were 4 killed and 8 wounded.

South Africa.

Union Defence Forces.—General Orders.—By Colonel the Honourable Hendrik Mentz, Minister of Defence.

Defence Headquarters,
Pretoria, 12th January, 1921.

G.O. 3835.—Extracts from the *Union Gazette.*

(*a*) Regulations for the Award of a Decoration, Medal, and Wound Riband to Members of the Union Defence Forces for Service in the Republican Burgher Forces during the Anglo-Boer War, 1899-1902.

Attention is drawn to Government Notice No. 2307, dated 21st December, 1920, published in the *Gazette* of 24th December, 1920, containing Regulations for the award to citizens of the Union who are serving in the Union Defence Forces or are liable so to serve if called out for personal service in time of war under the provisions of the S.A. Defence Act, 1912, and who did true and faithful military service during the Anglo-Boer War, 1899-1902, in the military forces of the then Governments of the South African Republic and of the Orange Free State as burghers of the Republics aforesaid, of

(*a*) a decoration for devoted service to officers of those forces who rendered distinguished and specially meritorious service during that War;

(*b*) a medal to all ranks of those forces who did military service during that War;

(*c*) a wound riband to members of those forces who received wounds in action during that War.

Arabia.

Early in January "local bands" crossed into the territory of King Hussein and moved against Taif (50 miles E.S.E. of Mecca) and against the communications

from that city to Medina, in considerable force. Reinforcements and supplies were sent to Taif. [This indicated a revival of the hostilities, in 1919, between the Ibn Sands of Neja (representing the Wahabite section of Islam) and the kingdom of the Hedjaz.]

Hodeida.—11th January. Reports from Hodeida, then garrisoned by British Indian troops, stated that the Imam Yehia of Senaa had captured Hajjaila and was advancing on Bajil in the Tehama and against Buraa. Mahmud Nedim Bey, a Turk, was in command of Imam Yehia's forces, which were vigorously attacking the Tehama region. On this date the movement threatened Hodeida.

Later reports, however, confirmed the news that the Idrisi party had succeeded in driving back the Imam's forces, reoccupying Hajjaila, and recovering a portion of the Bilad-al-Taraf.

On the 31st January it was reported—from Aden—that the British garrison (one battalion of Indian troops) had evacuated Hodeida without any incident.

GERMANY.

Surrender of Arms.—Between the Armistice and 24th February the armaments surrendered by Germany to the Allied Control Commission amounted to:—

Guns	37,313
Machine Guns	75,664
Rifles and Carbines	3,317,995
Loaded Shells	33,263,515
Small Arms Ammunition	400,413,400
Aeroplanes	15,368

Included in the total of guns surrendered were 6,000 guns under construction, which were destroyed.

Allied Occupation of Düsseldorf, Duisberg, and Ruhrort.—On 8th March, in consequence of the non-acceptance by the German delegates to the Conference in London, of the Allied terms regarding Germany's indemnity, British, French, and Belgian troops occupied the above Ruhr towns with great suddenness and success. On the night of 7th, squadrons of 14th Hussars had moved quietly out of Cologne, and on the morning of 8th marched into Düsseldorf where they established control over the southern portion of the town; while Belgian units, marching up from the Crefeld area, occupied the northern section. Also by 6.0 a.m. the same day the British Rhine flotilla had anchored under the walls of the capital of the Ruhr. Meanwhile, many French units moving eastward over the Rhine shared the occupation of Düsseldorf and farther north of Duisberg and its waterside suburb Ruhrort, one of the largest inland harbours in the world. Later the Allied troops spread their line of outposts eastward and occupied barracks and points of control hitherto held by German security forces.

On 18th March the western quarter of Mulheim-on-Ruhr, together with the Speldorf Railway Station, was occupied by Franco-Belgian troops. The railway station of Oberhausen West and the locks of the Emscher Canal were also occupied by a small Allied force.

British Troops in Upper Silesia.—The British troops, under Colonel Wauchope, sent from the Rhine to Upper Silesia to maintain order during the plebiscite period, reached their destination on 11th March (War Office announcement 17th March). Brigade Headquarters were established at Labnitz, and the battalions were distributed as follows: 1st Royal Sussex, Tarnowitz-Benther; 2nd Black Watch, Lubnitz; 2nd West Kents, Kreuzburg, Karlsruhe, Noldau; 1st Middlesex, Rosenburg-Lubnitz; Brigade details, Lubnitz and Oppeln.

Greece.

On 20th March the 1913, 1914, and 1915 classes of reservists were recalled to the Colours to reinforce the Greek forces in Asia Minor.

Italy.

D'Annuncio's Legionaries.—On 2nd January the disbandment of these Legionaries began. As each company left Fiume, a company of Regulars took its place, and special precautions were taken to avoid friction, as some of the Legionaries showed a very hostile spirit.

Mesopotamia.

On 7th March it was reported from Baghdad that local levies were relieving British and Indian troops in the Euphrates area north of Nasiriyeh.

On 11th March it was announced that the transport of the 6th Division had been practically completed. During the period 26th February-2nd March two British, two Indian battalions, and three batteries had sailed for Basra.

The withdrawal of British forces from Kifi and the Middle Euphrates Valley had also been completed, the units from this district returning to their normal stations.

Morocco.

Arab Attack on French.—On 16th March 2,000 Beni Mestra insurgents attacked a French supply column moving towards the advanced posts near Wazan [about 50 miles north of Fez]. The hostile Arabs were well armed, amply supplied with ammunition, and strongly entrenched on the heights dominating the road along which the column was proceeding. The fighting was very severe, and the combatant troops escorting the convoy had to carry by assault certain strategic points in order to enable the column—some 2,000 pack animals—to get through. In the course of the hand-to-hand fighting the Arabs suffered very heavy losses, leaving more than 100 dead on the field. The French losses consisted of 74 wounded.

Later reports stated that there was considerable unrest in the district; also that important gatherings of hostile Ghezawa tribesmen had taken place.

On 22nd March a telegram from Fez stated that severe fighting continued in Morocco. The advance of a column coming from Issual had to be made over difficult country in very arduous conditions. It was heavily engaged until nightfall, reaching about 6.0 p.m. the Jebel Waghar district (between Wazan and the Spanish zone). The losses of the insurgents were even heavier than those incurred on 16th March.

Mongolia.

On 10th February, after being more or less invested in Urga, the chief town of Mongolia, by a force of some 2,000 "White" Russians under Baron Ungeru for three months, the Chinese garrison of 10,000 men evacuated the town under shell fire, and were reported to be retiring southward.

Ungeru's troops, on the defeat of Koltchak's "White" Armies, penetrated Mongolia on the invitation of the Mongols.

On 18th March it was reported from Peking that the independence of Mongolia (from China) had been proclaimed on 25th February, and that Mongolian forces were marching southward, and had occupied Ude, in the middle of the Gobi Desert; also that panic prevailed at Kalgan (130 miles by rail north-west of Peking) where the advent of the Mongol hordes was daily expected.

Persia.

On 30th January a small body of Bolshevists, consisting mainly of troops of the 244th Russian Regiment, attacked the outposts of the British forces in North-West Persia under General Ironside. The British delivered a vigorous counter-attack, resulting in the capture of 9 wounded and 18 unwounded prisoners and 2 machine guns.

Russia.

Early in March an insurrection against the Soviet Government broke out at Kronstadt. The sailors of the Fleet joined the rebels, who were under the command of General Koslovsky and other "White" officers, and seized eight ships of the Baltic Fleet, including the battleship Petropavlovsk, whose guns were trained on Petrograd, on which the rebels threatened to march.

The reports of the subsequent operations were very conflicting, both sides claiming successes; but the following is a summary of events from 6th to 17th March.

6th March. In spite of reports to the contrary, the Soviet Government still dominated the situation in Petrograd.

7th March. The Kronstadt rebels began to bombard Petrograd, using very heavy artillery. On the other hand, Kronstadt was shelled by Soviet batteries at Systerbäk, Revounenal, and Tarbooka. The fortress of Krasnaya Gorka also opened fire, but owing to fog it was difficult to tell on which side its garrison was fighting.

Later telegrams stated that at first Krasnaya Gorka and the smaller forts fired on Kronstadt, which responded, directing the bulk of its fire, however, on Petrograd. Then suddenly the above forts turned their guns on Petrograd also.

Eight ships of the Baltic fleet took part in the bombardment on the 7th. The whole garrison of Oranienbaum (on the south shore of the Gulf of Finland, opposite Kronstadt) deserted to the rebels; the Bolshevists then sent regiments of the Labour Army against Oranienbaum, but part ran away and part deserted.

9th March. News reached Riga that early on that day the rebels had captured Petrograd, except the railway stations at Krasno Selo and Gatchina, but another despatch stated that on 9th and 10th the Bolshevists were still in possession of Petrograd, which they held with a firm hand.

13th March. It was reported from Riga that the Kronstadt sailors had captured Oranienbaum fortress after two days' hard fighting, the Bolshevist casualties being heavy.

15th March. This was contradicted in a telegram from Stockholm, which stated that Red troops had been making converging attacks from Oranienbaum, Systerbäk and Lisinos on Kronstadt across the ice, being repulsed with great loss.

17th March. Kronstadt succumbed to a combined attack of Soviet troops, numbering 60,000, at 11.0 p.m. Before retreating from the fortress the rebels blew up the warships Petropavlovsk and Sevastopol. The fighting portion of the garrison did not exceed 6,000.

During March other insurrectionary movements in Russia were reported, notably a revolt under the leadership of the Ukrainian General Makhno, who, after capturing Ekaterinoslav, was advancing towards the Crimea.

On 14th March, according to official reports from Constantinople, the rebellion against the Soviet Government in Northern Caucasia had extended to the Cossack districts, where it was gaining ground. The Kuban Cossacks were threatening Stovropol, while the Don Cossacks had revolted "en masse" under the influence of the latest events in Central Russia.

Siberia.

Vladivostok.—On 10th February General Semenoff issued a proclamation to the effect that he was resuming the Chief Command of the Russian Far-Eastern Army.

[Note.—General Semenoff is Ataman of the Trans-Baikalian Cossacks.]

Silesia.

On 3rd March the first detachment of British troops sent to maintain order during the impending plebiscite in Upper Silesia arrived. Of the four battalions composing the British force one battalion was to go to Oppeln, one to the district of Kosel, one to that of Ratebor, and the fourth to that of Gross-Strehlitz, east of the Oder.

Syria.

On 9th February Aintab, a town of 70,000 inhabitants in North-East Syria, which has been besieged by French troops since 6th March, 1920, surrendered to the French.

Transcaucasia.

On 25th February, owing to their failure to suppress anarchical riots which broke out in Tiflis at the instigation of Bolshevist agents, the Georgian forces melted away, allowing the Bolshevists to advance and capture Tiflis. On the same date another Bolshevist Army was advancing along the coast road towards Batum, towards which the Turks were reported to be moving.

On 6th March it was reported that the Georgian Army, reinforced by troops withdrawn from the Batum area, had rallied and begun two offensives: one against the Bolshevists advancing from Kutais, the other against the weak Bolshevist column moving along the coast road from the north.

The result of the latter move was the capture, on 4th March, of Sukhum and Gagri in the Abkhasia province.

[About this date the Turks had advanced from Khopa to Makriali, apparently ready to occupy Batum, which they did on the 12th.]

The Georgian rally was, however, short-lived, and by the 9th March the Georgian Army had ceased to exist—the Government fleeing to Batum. On this date a Bolshevist Army was rapidly advancing southward from Akhaltzik.

On 19th March reports from Constantinople stated that the Georgian Government had turned Bolshevist, and Georgian forces, once more reorganized, had expelled the Turks from Batum.

Turkey.

Nationalist Forces.—On 6th January it was announced that the Turkish Nationalists were preparing to bring over to the Smyrna area (held by the Greeks) forces formerly employed against Armenia. On that date they were mobilizing fresh forces; training schools for officers were being formed at Angora and Erzerum, and cavalry schools at Sivas, Chorun, and Kaisariya.

Greek Advance.—On the 10th January, east of Smyrna, Greek forces were advancing in three columns 19 miles north of the Banaz [a tributary of the Meander], while two divisions were under orders to proceed to Ushak [150 miles east of Smyrna] as supports.

Strength of Kemalist and Greek Forces.—About 23rd February information from Greek military sources put the total strength of the Kemalist forces in Asia Minor at something under 60,000, including all auxiliary troops.

The Kemalists were then in three groups: (1) Eastern, (2) Southern, and (3) Western, the latter from 30,000 to 34,000 strong.

Facing this group was a Greek Army of 130,000.

On 23rd March the expected Greek offensive started, the objective being to annihilate the Kemalist forces.

On 24th March an official communique from Smyrna stated that the Greek troops began to attack that morning and occupied a line to the east of Ushak. Near Brusa they also attacked the Kemalists, obliging him to retreat eastward. The River Gallo was crossed, and Hassan Pasha, Fundukli, and Yenisher (13 miles from the Greek base) were occupied.

On 27th March further Greek successes were reported, the Turks evacuating Afium Karahissar, which was occupied by the Greeks.

Up to 27th March the Kemalist forces were holding on to Eskisher, in spite of the danger on both flanks created by the Greek occupation of Belijik and Afium Karahissar. On that date it was believed that the Turks had selected defensive positions along the line Kastanium—Kangri—Angora, where their main forces were concentrating.

On 28th March, however, the Greeks captured Eskishehr.

United States.

Flag of Royal American Infantry.—On 9th January the regimental Colours of the Royal American Infantry, dating from the year 1753, were returned to Trinity Church Corporation at a special service on Governor's Island, in New York Harbour, by the British Military Attaché, Major-General H. K. Bethell.

When the Colonial regiment ceased to exist the flag passed into the hands of certain families in Great Britain, and Lord Grenfell has now returned it to the United States.

U.S. Troops in Germany.—On 12th January the War Department ordered the reduction of the American forces in Germany from 15,000 to 8,000.

Mexican Frontier Fighting.—On 18th March prolonged fighting took place between more than 100 United States soldiers and immigration inspectors and a number of Mexicans (believed to be liquor smugglers) who attempted to force a passage across the River Rio Grande. The attempt failed.

ROYAL AIR FORCE NOTES.

UNITED STATES OF AMERICA.

Naval Aviation.

The estimates for the financial year, 1st July, 1921, to 30th June, 1922, have been heard before a Sub-Committee of the House of Representatives, and have been drafted as a Bill and reported to the House, but will not be passed until during the present sitting of Congress.

In giving evidence before the House Committee, Captain Craven, Director of Naval Aviation, stated that in his opinion the United States of America was in

every respect behind the times in naval air development, and that in order to establish her position she would require to carry out extensive experiments for the use of deck aircraft, both from carriers and from the turrets of battleships. There was no aircraft carrier yet complete in the United States. Naval scout machines in particular would have to be developed, as it was his opinion that the future naval battle would be decided in its opening stages by aircraft, and the result would unquestionably be in the favour of the fleet whose aircraft first obtained the mastery of the air and could report upon the movements of the enemy fleet. In a later stage of the battle mastery of the air would enable a fleet to send bombing and torpedo-carrying machines from its aircraft carriers to destroy the enemy ships, and reconnaissance machines to direct the artillery of the fleet. Practically the whole of the future development was to be in the direction of co-operation with the fleet with a view to making the battle fleet successful.

The maintenance of a certain number of coastal air stations was also very necessary for defence against submarine attack or attempted landings, more especially at the present time and until facilities afloat have been established. Questioned on the subject of an amalgamated air service, Captain Craven urged that the matter should be very carefully considered before any steps were taken in that direction, as it was his opinion that from the naval point of view it could only result in loss of efficiency and additional expense to the Government.

Strenuous efforts are being made to urge the Government to vote sums of money sufficient for the construction of two large aircraft carriers, but at the present moment it appears doubtful whether the money will be forthcoming.

The following interesting details have been received regarding the experimental bombing of the old battleship " Indiana " which was carried out in October last. These experiments were carried out in order to ascertain :—

(*a*) What percentage of hits may be expected from bombing machines dropping bombs from various heights.

(*b*) What damage will be sustained by a vessel as the result of a direct hit from a bomb.

(*c*) At what distance from the side of a vessel will bombs do material damage.

To ascertain the first, one hundred 50-lb. sand bombs were dropped from varying heights, and it is claimed that 11 per cent. of hits were obtained; no live bombs were dropped. F-5-L flying boats with twin 360-h.p. Liberty engines were used.

The second experiment was carried out by placing a 900-lb. bomb, containing 880 lb. of T.N.T. and 20 lb. of Amitol on the deck. Considerable damage was done to the deck and superstructure, but from the available photographs it is impossible to say how far downwards in the interior of the ship damage was done. Variously shaped bombs of different weights were exploded in the same way, but there is no available data from which a satisfactory conclusion as to the extent of the damage done can be reached.

The third experiment was carried out by detonating bombs at carefully measured distances from the sides of the ship and at varying depths. There is no doubt that this experiment was extremely satisfactory. In one report it is stated that the vessel began to sink as the result of one bomb containing only 214 lb. of explosive placed about 60 feet below the surface of the water and 30 feet from the stern of the ship. It damaged the stern of the ship, bent the rudder posts and propeller shaft, according to this report. In this connection it must be remembered that the " Indiana " is of an out-of-date class, and has only very thin armour.

Photographs prove that the ship was sunk by these experiments, and in one she is seen lying on the bottom with the interconnected buoys to which the bombs were attached clearly discernible in the foreground.

There is little doubt that as a whole the experiments were gratifying to the American Navy Department.

Further experiments are to be carried out in the near future, and will be divided into three tactical exercises, the first of which will be the location from a land base by a squadron of bombing machines of the obsolete battleship "Iowa," steaming on an unknown course under wireless control. The second exercise will be the bombing of the "Iowa," using dummy bombs of standard size, form and weight, the "Iowa" to be steaming at her highest practicable speed and manœuvring to avoid bombs as far as is possible under wireless control, the machines to be flown at the maximum speed attainable. The third exercise will be the bombing with actual live bombs of the three ex-German destroyers, using 230 lb. bombs; the ex-German light cruiser "Frankfurt." using 250 lb. and 520 lb. case bombs; and of the ex-German battleship "Ostfriesland," using 250, 520 and 1,000 lb. bombs.

Military Aviation.

A Bill is now before the House of Representatives which has as its purpose the creation of a Department of Aeronautics co-equal with the Departments of War and the Navy, the organization of a United States Air Force embracing both naval and military aviation, and the control under the same Government Department of civil and commercial aviation and air navigation. It is not possible to hazard a guess, at the present moment, as to the eventual fate of the Bill. There is considerable support for the measure in both Houses.

This Bill is not the first attempt in this direction. During the last two years several somewhat similar measures have been introduced by various Senators, all of which, however, failed to pass Congress, chiefly by reason of their having been introduced at unpropitious moments and having met with more or less organized opposition, for which the Senior Officers of the Navy were largely responsible.

General Mitchell, the Assistant Director of Military Aviation, stated during his evidence before the House Committee on appropriations that the most vulnerable parts of the United States were from Chesapeake to Boston and from New York to Chicago; by having a sufficient Air Force in New Jersey ready for immediate action, any part of that area could be reached in a few hours. What was needed was a brigade of 600 machines behind the Atlantic coast, of which 60 per cent. should be "pursuit," 20 per cent. "attack," and 20 per cent. "bombing"; the same for the Pacific coast. Through the country in general two brigades of 600 machines each. As an auxiliary to these there should be 17 observation flights of six machines each at 200 mile intervals along the coast. The total force should consist of 3,200 machines and an appropriate number of personnel, of which one-sixth should be with the Colours and five-sixths on the Reserve, on a basis of a construction programme of $45,000,000 (no more than the cost of one battleship). This force could be built up and made efficient in one year.

On the same occasion General Menoher stated that the existing organization of the Army Air Service was hopelessly inadequate, and laid stress on the necessity for establishing a very strong reserve and of expending considerable sums of money on maintaining its efficiency. It was his theory that the organization of the Regular Army Air Force should be confined to the smallest possible numbers, and that the main portion of the Air Service should be built up of reserves.

FRANCE.

Naval Aviation.

The Senate has voted 33,807,300 francs for naval aviation during the current year. The sum originally voted by the Chamber of Deputies was, roughly, 10,000,000 francs greater; the reduction was made "pending the publication of a definite programme." During the discussion M. de Lavrignais expressed the opinion that it was wrong to consider that the fleet of the future would consist entirely of submarines and aircraft. These were merely a new form of weapon, to meet which improved means of defence and attack were being devised. Their part should be to work in liaison with the surface fleet in the same way in which the aircraft of the Army work with the infantry and artillery.

Military Aviation.

The sum of 246,071,050 francs has been voted by the Senate for military aviation.

A new scheme has been devised for the subsidizing of air transport companies, which provides as a qualification for the receipt of a subsidy that the company must maintain a certain minimum number of machines, and that these machines must be of a type built to the specification of the Section Technique of the Under-Secretariat of Aeronautics. In this way the French Government transfers to civil enterprise the responsibility of maintaining a reserve of machines readily adaptable for war purposes, and although very considerable increases in the amount paid out by the Government in subsidies are involved, there are obvious advantages in this method of maintaining a reserve. A further qualification exists which necessitates the employment of a minimum number of personnel, so that a reserve of pilots and mechanics is also provided for. The regulations provide that a number of machines be maintained equal to twice the quotient obtained by dividing the total number of hours flown by the company's machines by 200 (in the case of land machines) and 150 (in the case of seaplanes or flying boats), the total flying hours being obtained by dividing the total distance flown by 130. Thus: Assuming that a company wishing to qualify for the new subsidy has for the past twelve months carried out passenger services from Paris to London (approx. 350 kilometres), one machine flying in each direction once each day for 300 days in the year, and allowing a reserve of two machines at each end. The company has, therefore, six machines flying a total of 700 kilometres per day for 300 days = 210,000 kilometres during the whole period. This divided by 130 represents a total of approximately 1,615 flying hours in the year (·74 hour per machine per day over the whole period). Therefore, in order to qualify for the new subsidy the company must maintain a number of machines equal to twice 1,615 ÷ 200; thus, instead of six machines they must now keep sixteen to do the same work.

As regards personnel the company must, to qualify for the subsidy, employ one pilot for every three machines and one mechanic for every 300 h.p. utilized. Therefore, in the case of the supposed company under reference it will be necessary, in order to keep two machines in the air for less than three-quarters of an hour per diem each for 300 days in the year, to have sixteen machines, five pilots, and upwards of sixteen mechanics.

SPAIN.

Strenuous efforts are being made to obtain a special vote of 100,000,000 pesetas (£3,958,333 at par rate) for the Army Air Service. The scheme of organization has been drawn up based upon this vote, but as it is considered doubtful that the

whole of the sum will be granted, two other schemes have been drawn up, one based on 75,000,000 pesetas and one on 50,000,000 pesetas. The authorities appear to be confident that at least the latter sum will be forthcoming.

The Spanish Government has granted what amounts virtually to a monopoly for the construction of aircraft for the Army to the Hispano Company of Guadelajara, under the terms of which the Government grant the remission of Royal Dues, which are very heavy in Spain, and Stamp Duty; the reduction of 5 per cent. of taxes during a period of five years; the remission of all Export Dues on the output of the company during a period of five years. The Government further promises that there shall be no Government competition except under peculiar circumstances. In return the company, on completion of the necessary factory, is bound to construct 150 lorries and 150 aeroplanes per annum. This condition, however, will not be enforced immediately in view of the lack of experience in aeroplane building, but after the company has enjoyed the privileges enumerated above for the period of three years, the advisability to enforce the condition shall be considered.

GUATEMALA.

The French Military Mission has arrived in Guatemala. The Mission has for its object the entire organization of the Guatemalan Army, and has attached to it an aviation section consisting of one air service officer and one mechanic. The terms of contract of the Mission provide that the chief of the Mission must be called upon to give his advice whenever the organization and development of the Army and Air Service is in question. The Guatemalan Government undertakes to give preference to French industries in regard to supplies of material for the Army, especially as regards aviation supplies.

SOME FOREIGN MILITARY PUBLICATIONS.

BULLETIN BELGE DES SCIENCES MILITAIRES.

CONTENTS:

No. 10 (February, 1921).

OPERATIONS OF THE BELGIAN ARMY DURING THE CAMPAIGN 1914-18.
GAS. (By a Regimental Medical Officer.)
THE FIELD RAILWAYS OF THE BELGIAN ARMY DURING THE WAR 1914-18.
THE RÔLE OF OFFICERS, FROM EXPERIENCE IN THE WAR.
THE MONO-WHEEL STRETCHER.
AERONAUTICS.
INTELLIGENCE OF FOREIGN ARMIES.
BIBLIOGRAPHY.
SUMMARY OF REVIEWS.
BOOKS ADDED TO THE LIBRARY OF THE MINISTRY OF NATIONAL DEFENCE IN JANUARY, 1921.

No. 11 (March, 1921).

TACTICS OF ARTILLERY.
THE GERMAN RESERVE CORPS AT THE BATTLE OF YPRES.
EMPLOYMENT OF CAVALRY.

REVUE MILITAIRE GÉNÉRALE.

CONTENTS :

No. 12 (December, 1920). Publication delayed by strike.

FOCH'S PLACE IN HISTORY.

THE TRANSPORT BY RAIL OF THE AMERICAN ARMY IN FRANCE (1917-19). (Continued.)

RÔLE AND TACTICS OF CORPS HEAVY ARTILLERY.

BASIS FOR A REORGANIZATION OF THE NATIVE ARMY IN NORTH AFRICA.

BIBLIOGRAPHY.

No. 1 (January, 1921).

JOURNAL OF THE OPERATIONS OF THE EIGHTH FRENCH ARMY IN FLANDERS, 20TH OCTOBER, 1914, TO 5TH APRIL, 1915. By its commander, General D'Urbal.

THE RECASTING OF OUR TRAINING MANUALS AND OUR WAR DOCTRINE. (Continued.)

THE IIND ITALIAN CORPS ON THE FRENCH FRONT.

No. 2 (February, 1921).

SHORT HISTORY OF THE SUPREME WAR COUNCIL. (A very interesting summary. It is pointed out that Maréchal Foch was never the French Military Representative, as so often stated, and at the first meeting he attended in May, 1918, after being given " strategic direction of the military operations," the Executive Council was abolished.)

MILITARY ACTIVITY IN FOREIGN COUNTRIES.

ARCHIVES DE LA GRANDE GUERRE.

CONTENTS :

No. 18 (January, 1921). (The last number appeared July, 1920.)

TO THE MARNE, 1914. (Translation of Lieut.-General Tappen's pamphlet " Bis zur Marne." He was Chief of the German Operations Section in 1914-15.)

TWO YEARS IN LORRAINE WITH THE 222ND INFANTRY REGIMENT.

A GERMAN MEMOIR ON THE PEACE CONDITIONS TO BE IMPOSED ON FRANCE, DATED 20TH MAY, 1915. (Issued by the Central Federation of German Manufacturers, the League of Agricultural Proprietors, and some similar societies, and signed by the five Presidents.)

THE BATTLE OF VITTORIA VENETO. (Austrian remarks on the Italian official account, translated from the " Oesterreichische Wehr-Zeitung.")

TWO YEARS OF MILITARY POLITICS IN GREECE.

THE SUBMARINE WAR. By Capitaine de Vaisseau Poidloüe.

WISSEN UND WEHR.

CONTENTS :

No. 1 (1921).

THE GERMAN EMPIRE. A Jubilee speech by Professor Marcks. (" Germany remains united.")

FRANCE IN JUNE, 1871. (A picture of the various internal struggles.)

THE FOUNDATIONS OF THE YEAR 1921. (A review of the situation.)

THE DARDANELLES ADVENTURE. (A study by Admiral von Maltzahn.)

THE SITUATION IN POLAND.

No. 2.

THE PRESS AND PUBLIC OPINION. (A review from Frederic II's time onwards.)

THE THOUGHTS OF THE MAN AT THE FRONT. (Brings out the difference between the fighting man and those who stayed at home or were on L. of C.)

FREDERIC THE GREAT'S METHOD OF JUDGING WAR SERVICES. (As a whole, not by details.)

THE BATTLE OF SOISSONS, 7TH-14TH JANUARY, 1915.

AT FRENCH G.Q.G. (A lengthy review of Jean de Pierrefeu's book.)

THE MILITÄR WOCHENBLATT.

Articles of military interest concerning the War, which have appeared between October, 1920, and March, 1921.

For previous articles, see the R.U.S.I. JOURNAL of February, 1921.

(A new volume of the *Militär Wochenblatt* began in October, 1920. Since then it has appeared only once a week, instead of twice, as formerly.)

No. 1.

THE REGIMENTAL OFFICER IN THE WORLD WAR.

The author, Colonel von Weitershausen, writes a pæan of praise to the regimental officer. "From the glorious days of 1914 to the terrible ones of 1918 it was he who bore the brunt of everything."

No. 7.

1914: THE ERRORS OF THE HIGH COMMAND.

A criticism of General Percin's book of this title.

No. 10.

THE MIRACLE OF THE MARNE, 1914.

Lieut.-Colonel Dieterich, who commanded an artillery brigade in the German Second Army, writes his personal experiences during the critical days, 5th-10th September, of the Marne fighting. He declares that the Second Army need not have retired on the 9th, and that, even though it did, there was no need for the retreat of all the German Armies, since the victory of the left wing of the Second Army was sufficiently complete to counterbalance any reverse on the right. No one at the time had the remotest idea of what tragic consequences the retreat to the Aisne line was to bring in its wake.

No. 11.

OBSERVATIONS FROM THE FRONT OF THE SECOND ARMY DURING THE BATTLE OF THE MARNE, 1914.

A subaltern who served in the 9th Jäger Battalion during the battle on the Marne relates his experiences. The "Second Army" in the title is a misprint for "First Army," as the 9th Jäger Battalion was attached to the IInd Cavalry Corps. The author describes the operations of his unit from the 5th-10th September, during which time the German Ist and IInd Cavalry Corps were engaged in holding up the British Expeditionary Force while Von Kluck was trying to win the battle on the Ourcq. He remarks on the lack of offensive spirit and sluggishness of the British advance, and maintains that the Germans could have put up a much longer stand on the Marne on the 9th September between La Ferté sous Jouarre and Mery.

No. 12.

BATTLE OF THE MARNE, 1914.

General Baumgarten-Crusius contributes an interesting article on the part taken by Lieut.-Colonel Hentsch in the orders to retreat given during the battles on the Ourcq and the Marne. He declares that Von Bülow was responsible for the retreat of the Second Army, and the right wing of the Third, and that this was unnecessary. He also maintains that the First Army Headquarters can alone be held responsible for its own retreat, and that Von Moltke was responsible for the whole of the western armies being involved in the retreat.

No. 13.

THE TRUTH ABOUT THE MARNE, 1914.

Colonel Müller-Loebnitz does not agree with some of the conclusions arrived at by General Baumgarten-Crusius in the article mentioned above (No. 12), particularly as regards his assertion that Von Kluck was responsible for the retreat of the First Army: for this, he emphasizes the influence of Colonel Hentsch on the matter.

No. 15.

GERMAN OPERATIONS DURING THE CAMPAIGN IN ITALY.

This is a version of the Austrian General Krauss' book of that title. The reviewer complains that it was difficult to spare any German troops for what was practically a side-show in Italy; he acquits General Krauss of anti-German feeling, though at the same time he has clearly a poor opinion of the General's skill as a leader or of his accuracy as a historian.

No. 20.

THE TURNING POINT OF THE WAR.

Colonel Müller-Lobnitz's pamphlet of this name is here reviewed. It is regarded as one of the best accounts that have yet appeared on the battle of the Marne, 1914. The general conclusion reached is that what was really a victory was changed by the German Supreme Command first into a retreat and then into a defeat.

Nos. 23 and 24.

THE STUDY AND CRITICISM OF MILITARY HISTORY.

In this article, contributed by General Ludendorff, the author points out the importance which has rightly been given to military history in the German Army, and then proceeds to indicate the lines on which it should be studied.

No. 23.

THE MARNE CAMPAIGN, 1914.

A review of General von Kuhl's book of this title. As Chief of the Staff of the First Army, General von Kuhl was in a position to have first-hand knowledge of events, and he describes them clearly and well. The reviewer considers that the leading of the First Army in August and September, 1914, was, on the whole, a first-rate performance.

No. 25.

THE ROUMANIAN CAMPAIGN.

A review of the first volume of General von Falkenhayn's account of the Roumanian campaign. It describes the manner in which General von Falkenhayn,

with the German Ninth Army, disposed of the Roumanian First Army, and recounts the battle of Hermannstadt.

No. 25.

IN BATTLE UNDEFEATED.

This is the title of a book contributed to by all the famous German fighters, from Hindenburg to Richthofen, the commander of the flying "Circus." It is compiled in popular form, and is intended to stimulate the confidence of the German people.

No. 28.

THE FEAR OF A GAP.

The author of this article, Julius Frontinus, says this fear of a gap being created in the German battlefront was unreasonably strong on the German side. Germany clung too much to linear strategy, chiefly because the difficulty of expanding a gap was under-estimated. The writer maintains that there is no danger in a gap of small dimensions, so long as the flanks are strong. He says that whenever the German line was pierced in France it was pushed by from the front, instead of being attacked from the flanks. As a special instance he describes the German counter-stroke at Cambrai on the 30th November, 1917.

No. 29.

THE BREAK-THROUGH ON THE MACEDONIAN FRONT IN SEPTEMBER, 1918.

General von Zwehl, the author, maintains that this was due to the Bulgarians having lost all heart for further resistance. Before the attack fifteen German battalions had been withdrawn to the Western Front, leaving only three to support the Bulgarians. He says the attack was not a surprise, as it had been foretold by Serbian deserters and aeroplane reconnaissances. The question as to whether it would not have been better to push on in 1915 and occupied Salonika is discussed.

PRINCIPAL ADDITIONS TO THE LIBRARY.

February—March—April, 1921.

BATTLE OF JUTLAND, 30TH MAY TO 1ST JUNE, 1916. OFFICIAL DESPATCHES WITH APPENDICES. Charts in case. 8vo. 17s. 6d. Parliamentary Paper [Cmd. 1068], 1920.

JANE'S FIGHTING SHIPS, 1920. Illustrations. Obl. 8vo. 42s. (Sampson Low, Marston & Co.) London, 1920.

RECORD OF THE 2/4TH BATTALION HAMPSHIRE REGIMENT, 1914-1919. Maps. N.P. N.D. (Presented by the Regiment.)

A VANISHED DYNASTY. ASHANTI. By Sir Francis Fuller, K.B.E., C.M.G. Illustrations and Maps. 8vo. 16s. (John Murray & Co.) London, 1921.

KIEL AND JUTLAND. By Commander Georg von Hase. Illustrations and Maps. 8vo. 16s. (Skeffington & Sons.) London, 1921.

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THE BATTLE CRUISERS AT THE ACTION OF THE FALKLAND ISLANDS. By Commander Rudolf Verner, R.N. Edited by Colonel Willoughby Verner. Illustrations. 4to. 42s. (John Bale & Sons.) London, 1920. (Presented by the Publishers.)

HISTORY OF THE GREAT WAR. BASED ON OFFICIAL DOCUMENTS. By Direction of the Historical Section of the Committee of Imperial Defence. The Merchant Navy. Vol. I. By Archibald Hurd. Illustrations and Maps. 8vo. 36s. (John Murray.) London, 1921. (Presented by the Publishers.)

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THE NATION'S FINANCIAL OUTLOOK. By A. B. Thornton, F.S.I. 8vo. 2s. 6d. (P.S. King & Son.) London, 1921.

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THE GREAT WAR IN 1914: A SKETCH OF THE OPERATIONS IN EUROPE AND ASIA WITH SOME REFLECTIONS AND OBSERVATIONS. By Lieut.-Colonel F. R. Sedgwick, C.M.G., D.S.O., R.F.A. Illustrations and Diagrams. 8vo. (Forster Groom & Co.) London, 1921. (Presented by the Publishers.)

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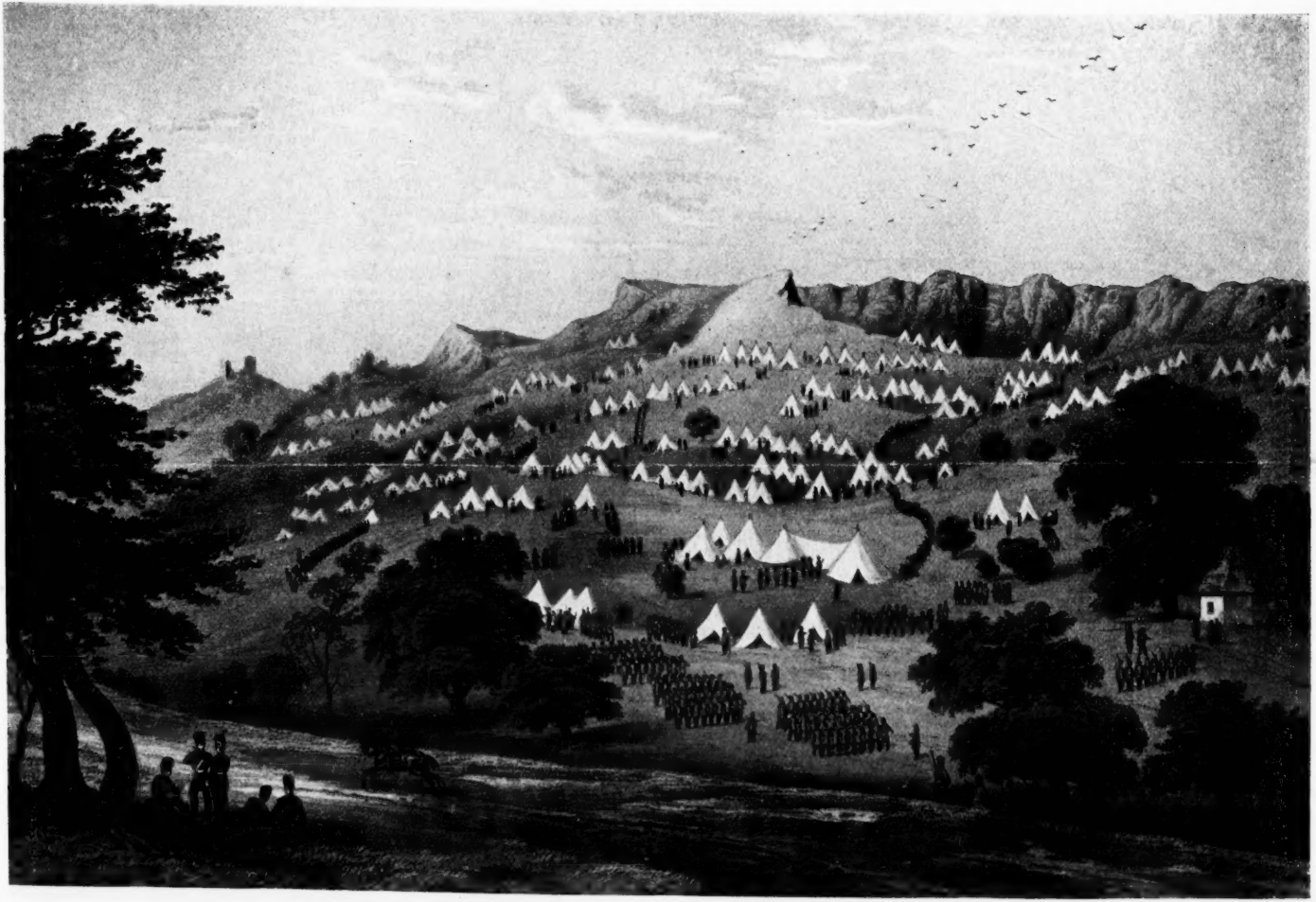

THE CAMP OF THE FOREIGN LEGION NEAR HYTHE.